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NOTICE

The December (concluding) number of Volume 11 will consist of the authors' and subject indexes for the volume. This volume, therefore, should not be bound until the number, which will be considerably delayed, is received. Meanwhile publication of Volume 12 will proceed.

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No. 4

ENTRIES 3266-4895

AGRONOMY

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(See also in this issue Entries 3393, 3396, 3434, 3474, 3511, 3607, 3620, 3628, 3630, 3631, 3855, 3856, 3857, 3865, 3866, 3867, 3895, 3896, 4057, 4089, 4302, 4337, 4437, 4454, 4495, 4496, 4552, 4557, 4584, 4590, 4657, 4679, 4694, 4741, 4748, 4755, 4756, 4764, 4765, 4784, 4880)

3266. ANONYMOUS. Corowa growing crop competition. *Agric. Gaz. New South Wales* 33: 250-252. 1922.—An account of a competition for the production of the best 40 acres of wheat is given. The crop was scored as follows: yield, 40; typeness, 20; freedom from disease, 20; freedom from weeds, 10; evenness, 10. Ten competitors finished. The Bomen variety was entered by 4 competitors.—*L. R. Waldron.*

3267. ANONYMOUS. El cactus Burbank. [The Burbank cactus.] *Rev. Agric. Com. y Trab. [Cuba]* 5: 31-32. 1922.—The author reviews the value of the plant in certain localities and discusses methods of propagation. The cactus is considered of little use in Cuba on account of abundant pasture of better forage.—*G. R. Hoerner.*

3268. ANONYMOUS. La yuca, fuente de riqueza. [The yuca, a source of wealth.] *Rev. Agric. Com. y Trab. Cuba* 5: 7. 1922.—A brief note is presented on recent investigations of the value of products of this plant [cassava] for human consumption.—*G. R. Hoerner.*

3269. ANONYMOUS. Melilotus alba as a green manuring crop. *Agric. Gaz. New South Wales* 33: 360. 1922.—At Hawkesbury Agricultural College grey field peas surpassed sweet clover as a green manuring crop. The yield of the sweet clover was estimated at 3 tons per acre and the yield of field peas was calculated at 10 tons.—*L. R. Waldron.*

3270. ANONYMOUS. Sugar experiments. Summary of twenty-one years' work. *Australian Sugar Jour.* 14: 33-35. 1922.—A preliminary summary is given of deep-cultivation experiments in cane fields extending over a period of 21 years. Subsoil cultivation upon alluvial soils, such as at Mackay and those with clay subsoils, was advantageous. Subsoiling experiments upon the open porous red soils of Bundaberg and Isis have never given good results. Different methods of subsoiling treatment were tried both with plant and with ratoon crops.—*C. Rumbold.*

3271. ANONYMOUS. Una leguminosa forrajera perenne de varios cortes anuales. [A perennial leguminous forage plant of several cuttings annually.] Rev. Agric. Com. y Trab. [Cuba] 5: 15. 1922.—The value of *Meibomia Rensoni* Paynter (*Desmodium Rensoni*) as compared with other importations tested under Cuban conditions is discussed. This Central American species has proved of great promise as a Cuban forage plant. [See also Bot. Absts. 11, Entry 3289].—G. R. Hoerner.

3272. ANAMS, R. L. Farm management. 671 p., illus. McGraw Hill Book Co.: New York, 1921.—The book is an extensive presentation of the place and scope of farm management, including recommended and actual farm practices in improving soil quality with green manures, commercial fertilizers, stable manures, crop rotations, cropping systems. Selection of crops for given conditions, diversified contrasted with specialized farming, costs of producing crops, and profits from crops are discussed.—C. V. Piper.

3273. ADNIS, JOSÉ M. Experimentos con malangas. [Experiments with dasheens.] Rev. Agric. Com. y Trab. [Cuba] 4: 537-541. 1921.—Further experimental work has been carried out at the Cuban experiment station with dasheens (*Colocasia*). Plantings of a series of strains of the variety Blanca were made in order to select those giving highest yields. The results are given in tabular form. Other plantings were made in order to ascertain the influence of size and shape of seed tubers on yield. Large tubers gave highest yields. In a planting of the 4 varieties Japonca, Rosada, Trinidad and Morada, Rosada gave the highest yield.—John A. Stevenson.

3274. ALBRECHT, WM. A. Viable legume bacteria in sun-dried soil. Jour. Amer. Soc. Agron. 14: 49-51. 1922.—Soil containing *Pseudomonas radicola* was effective for inoculation if dried in the absence or presence of direct sunlight or if stored dry for 30 months, and was as good for inoculation purposes as fresh moist soil gathered from the field. Hence, direct sunlight and desiccation are not destructive to this organism in its native habitat as has been commonly believed.—F. M. Schertz.

3275. AMES, C. T. Alfalfa culture. Mississippi Agric. Exp. Sta. Circ. 43. 4 p. 1921.—General recommendations for alfalfa growing in North Mississippi are given.—J. Fred O'Kelly.

3276. AMES, C. T. Report from Holly Springs Branch Experiment Station for 1921. Mississippi Agric. Exp. Sta. Bull. 202. 29 p. 1921.—This bulletin reports variety tests with corn, cotton, sweet potatoes, and alfalfa; fertilizer tests with cotton and corn; cotton spacing and cultivation; recommendations concerning erosion, permanent pastures, and forage crops.—J. Fred O'Kelly.

3277. ARNY, A. C., and F. W. McGINNIS. Methods of applying inoculated soil to the seed of leguminous crops. Jour. Amer. Soc. Agron. 13: 289-303. 1921.—In order to reduce the labor and expense involved in transferring soil containing legume bacteria to new fields, the practice of causing a small quantity of soil containing the necessary organisms to adhere to the seed has been recommended and widely used. The method consists of moistening the seed with a weak glue solution and then dusting on 1 bushel of seed approximately 1 pound of finely sifted, air-dry soil known to contain the desired bacteria. The results from this method have been quite variable. Water only and glue or sugar solutions of various strengths are not recommended. Equal weights of soil and seed mixed together and sown gave satisfactory inoculation as indicated by large nodules and a dark green, thrifty foliage growth. With 1 exception a commercial culture gave results similar to, and frequently more marked than, the use of equal amounts of soil and seed. Storage after the inoculum was applied did not result in a serious lowering of the nodules secured per plant. It is recommended that exposure to sunlight be avoided whenever possible.—F. M. Schertz.

3278. BAILEY, C. H. The character of 1919 crop spring wheat dockage. Jour. Amer. Soc. Agron. 14: 88-93. 1922.—Four hundred samples of Minnesota wheat contained an average

of 1.57 per cent of wild oats and 2.84 per cent of fine seeds and dirt. In addition considerable shrunken or shriveled wheat was found in the fine dockage. Inseparable seeds were found in varying percentages.—*F. M. Schertz.*

3279. BARTLETT, H., MARK H. REYNOLDS, and W. R. BIRKS. **Farmers' experiment plots.** Wheat and oat experiments, 1921. *Agric. Gaz. New South Wales* 33: 153-169. 2 fig. 1922.—In the western district experiments were conducted cooperatively on 10 farms with 25 wheat and 4 oat varieties. Canberra, Hard Federation, and Federation varieties of wheat and Algerian and Sunrise varieties of oats generally gave the best yields. Hamel wheat, newly originated in West Australia, showed much promise. It is emphasized that stud seed of the important varieties should be produced each year to prevent variety deterioration.—In the northwestern district best results were secured from Canberra, Clarendon, and Hard Federation varieties of wheat. The fact that "foot-rot" and "take-all" attack grasses commonly grown in meadows adds a difficulty to the method of crop rotation followed by many farmers.—In the central western district, wheat yields varied considerably but the following varieties are recommended for the main wheat areas: Hard Federation, Canberra, Federation, Yandilla King, and Florence. Promising new varieties are: Wandilla, Waratah, Onas, Wilfred, and Major.—*L. R. Waldron.*

3280. BARTLETT, H., R. N. MAKIN, W. D. KERLE, and J. M. PITT. **Farmers' experiment plots.** Wintergreen fodder experiments, 1921. *Agric. Gaz. New South Wales* 33: 177-190. 6 fig. 1922.—Experiments in cooperation with farmers were conducted in 4 regions of New South Wales to popularize mixed farming (sheep and wheat) by introducing a rotation to increase the stock carrying capacity of the farm. The crops used were mainly cereals,—wheat, oats, and barley, either alone or mixed with rape, peas, or vetches. Best yields, as a rule, were secured from some combination of cereal and legume rather than from any cereal alone.—*L. R. Waldron.*

3281. BIRKS, W. R. **Coonabarabran field wheat competition.** *Agric. Gaz. New South Wales* 33: 173-175. 1922.—A description of methods used and a tabulation of the scorings are given in this annual field wheat competition. Six farmers competed.—*L. R. Waldron.*

3282. BLAKE, S. F. **Two new western weeds.** *Science* 55: 455-456. 1922.—*Bassia hyssopifolia* (Pall.) Kuntze is reported from very alkaline soil in Nevada and other states. *Centaurea pteris* Pall. is reported from Idaho, where it is becoming a serious pest.—*C. J. Lyon.*

3283. BORNEMANN. **Düngungsversuch mit heissvergorenem Stallmist.** [Manuring studies with stable manure fermented at high temperatures.] *Mitteil. Deutsch. Landw. Ges.* 37: 38-40. 1922.—Stable manure was handled in such a way that a rapid rise in temperature took place. When the temperature had reached the desired point the manure was packed down and a new layer added. It is said that in 1 series of trials manure prepared in this way produced much larger yields of potatoes and with a higher nitrogen content than did common stable manure.—*A. J. Pieters.*

3284. BREAKWELL, E. **Popular descriptions of grasses.** *Agric. Gaz. New South Wales* 33: 191-197. 4 fig. 1922.—Three Mitchell grasses belonging to the genus *Astrelba* are described from an agronomic standpoint. These are *A. triticoides* (Curly Mitchell), *A. pectinata* (Bull Mitchell), and *A. clymoides* (Hoop Mitchell). Descriptions are given also of the kangaroo grasses, of which *Anthistiria ciliata* is an example; of native oat grass (*Anthistiria avenacea*), and of Flinders grass (*Anthistiria membranacea*). These grasses are all figured. It is pointed out that these grasses have nearly or quite disappeared from portions of their original habitats.—*L. R. Waldron.*

3285. BREAKWELL, E. **Top-dressing of pastures.** Experiments at Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 267-269. 1922.—Fertilizer applications to

pasture lands of introduced grasses are of immediate benefit and result in financial gains. Superphosphate and sulphate of potash appeared to be as beneficial as complete fertilizer. Use of these fertilizers induced a comparatively greater percentage of clovers.—*L. R. Waldron.*

3286. BROWN, E. B. Effects of mutilating the seeds on the growth and productiveness of corn. U. S. Dept. Agric. Bull. 1011. 13 p., 3 pl. 1922.—The effects of mutilations of seed coats and endosperms decreased the stand, especially in debulled seeds; decreased the size of plants; did not definitely affect height at maturity; retarded the development of plants; reduced the average number of ears per plant; lowered the weight of the ears and lessened the yield per plant to the extent of 7-10 bushels to the acre. Mutilated germs were also studied, showing that the entire embryo was not essential to germination, normal plants being developed from seeds cut into half through both embryo and endosperm. In laboratory studies 100 seedlings showing plumule and root development were obtained from 71 seeds sectioned longitudinally. The tip portions of the cross sections developed complete plants, but the crown portions developed nothing and there was no regeneration of one organ from another.—*J. T. Buchholz.*

3287. BROWN, H. B., and J. F. O'KELLY. Correlation between the yields and prolificness of corn varieties grown in Mississippi. Mississippi Agric. Exp. Sta. Circ. 40. 4 p., 2 fig. 1921.—A graphic comparison between plot yield and percentage of 2-eared plants is given.—*J. Fred O'Kelly.*

3288. BROWN, H. B., and J. F. O'KELLY. Cotton experiments. Mississippi Agric. Exp. Sta. Bull. 205. 16 p., 2 fig. 1921.—The authors report variety tests, including a study of earliness as indicated by bloom counts. Ammonium sulphate, nitrate of soda, and calcium cyanamid were found profitable when applied at the rate of 15 pounds available nitrogen per acre, whereas cottonseed meal proved unprofitable. The results with calcium arsenate in water and syrup solutions for boll weevil control were not satisfactory enough to warrant recommendation.—*J. Fred O'Kelly.*

3289. CALVINO, MARIO. El barajillo, leguminosa forrajera de América Central. [The barajillo, a leguminous forage plant of Central America.] Rev. Agric. Com. y Trab. [Cuba] 4: 547-548. 2 pl. 1921.—Seed of *Meibomia Rensoni* (Paynter) was received from the Republic of San Salvador, where it is indigenous. This plant is well suited to Cuban soil and climate, making an excellent forage plant when not allowed to grow too long. *M. Rensoni* is a wild perennial shrub, of rapid growth, attaining a height of 5-6 m., and commonly found at altitudes of 600-1200 m. above sea level. The plant resists prolonged drought, grows well in the poorest soils, and quickly produces new tops after each cutting. [See also Bot. Absts. 10, Entry 1490.]—*G. R. Hoerner.*

3290. CALVINO, MARIO. La harina de yuca para hacer pan. [Yuca flour for making bread.] Rev. Agric. Com. y Trab. [Cuba] 5: 4-9. 8 pl. 1922.—A general review is given of some of the work of the Cuban agronomic experiment station in the introduction and improvement of plants as food for animals and of the attention given to the possibilities of certain food plants for man. Chief among the latter is yuca. An historical review of the status of the use of yuca in countries other than Cuba is given as well as the development of its manufacture and use in Cuba. Details of manufacturing methods of yuca flour and the by-products starch and tapioca are presented. Costs of the various processes and directions for growing the plant are included.—*G. R. Hoerner.*

3291. CALVINO, MARIO. La luz y la producción vegetal. [Light and plant production.] Rev. Agric. Com. y Trab. [Cuba] 4: 532-536. 2 pl. 1921.—A popular discussion of the subject is given especially as it relates to tropical agriculture. Reference is made to, and abstracts are taken from, the works of several authors whose findings relate to tropical plants in general and the situation in Cuba in particular.—*G. R. Hoerner.*

3292. CALVINO, MARIO. Los "arrowroots" o "feculas comestibles." [The "arrowroots" or "edible starches."] Rev. Agric. Com. y Trab. [Cuba] 5^o: 16-17. 3 pl. 1922.—The "arrow root" of commerce is produced chiefly from *Maranta arundinacea* L. and *Canna edulis* Ker. (*C. esculenta* Lodd., *C. rubricaulis* Link). Both are adapted to Cuba. Cultural data are presented as well as methods of preparing the starch. Recipes are also given.—G. R. Hoerner.

3293. CALVINO, MARIO. Nuevo sistema de sembrar caña. Sistema "Ferrer." [A new system of planting cane. "Ferrer" system.] Rev. Agric. Com. y Trab. [Cuba] 5^o: 19-20. 2 pl. 1922.—Experiments were conducted to compare the new method of planting with the usual one on cultivated lands. The "Ferrer" system has been used on burned-over rough land where cultivation is not possible but has not been tried on tilled land. It consists in placing pieces of cane vertically in the soil and cutting them off at the soil surface. The method prevents the piece from drying out and does away with the necessity of opening and closing a furrow, thus reducing the cost of planting. The upper end of the seed piece is near the soil surface, and germination takes place earlier and in greater percentage, more suckers are formed, and larger clumps of greater height result. The need of resetting seed pieces that have not germinated is avoided. The adoption of this method is regarded as promising of large savings to growers.—G. R. Hoerner.

3294. CALVINO, MARIO. Una nueva gramínea forrajero para Cuba. [A new forage grass for Cuba.] Rev. Com. y Trab. [Cuba] 5^o: 4-5. 1 pl. 1922.—Seed of *Brachiaria brizantha* (Hochst.) Stapf. (*Panicum brizanthum*) was secured from Australia and Belgian Africa and sent to the Cuban Agronomic Experiment Station in 1920. The plant is generally well adapted to Cuban conditions and of value as a forage plant. It merits the attention of stockmen. C. V. Piper reports it as having given satisfactory results at Gainesville and Kiceo, Florida, and at McNeil, Mississippi.—G. R. Hoerner.

3295. CHANG, TUNG WU. [Selection of Trice cotton.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 24: 229-235. 1921. [Text in Chinese.]—The author relates the origin and type of the plant and describes in detail the latest methods used by American cotton breeders in selection of Trice cotton.—Chunjen C. Chen.

3296. CHEN, CHUNJEN C. [The cotton improvement of the U. S. Department of Agriculture.] Ko-Hsueh [Science Pub. Chinese Sci. Soc.] 6: 1:60-1266. 1921. [Text in Chinese.]—The author reviews various investigations in progress on improvement of cotton by the Bureau of Plant Industry, the Bureau of Markets, and the Federal Horticulture Board.—Chunjen C. Chen.

3297. CREMATA, MERLINO. Cultivo del boniato. [Cultivation of the sweet potato.] Rev. Agric. Com. y Trab. [Cuba] 5^o: 26. 1922.—Popular.—G. R. Hoerner.

3298. DAWE, M. T. Efwatakala grass [*Melinis minutiflora*] as a means for the control of the tsetse-fly. Tropic. Life 18: 69-71. 1922.—The writer found this grass in the Congo District of Angola, Africa. It was common in both the low country and on the plateau lands, but most abundant at elevations of 2,000-3,000 feet above sea level. Efwatakala grass is distributed over Africa from south of the Sahara to Natal, and also occurs in Madagascar. It is cultivated extensively in Brazil, where it is known as "Gordura" and "Capim mellado." In Africa it has various native names according to the tribe, but in the interior of the Congo District it is known as Efwatakala grass. Material collected in this region was identified at Kew as *Melinis minutiflora* var. *mutica*. The writer collected in Angola 2 other species, *M. gracilis* and *M. effusa*; the former is a very small grass, but the latter resembles in size *M. minutiflora*. A 4th species found in the Cabinda Enclave is called by the natives "Sala." It is a coarser grass of much ranker growth, the species being as yet undetermined. The writer suggests that, because of the strong odor emitted by Efwatakala grass in connection with the sticky glandular hairs which cover the leaves, it might act as a repellent to the tsetse-fly, ticks, and possibly

mosquitoes. The grass is a vigorous grower and thrives on both the uplands and lowlands, besides being palatable to cattle. It makes a splendid pasture grass, therefore, and when once established provides a source of income aside from its possible insecticidal value. The writer urges governmental encouragement for testing his idea in the tsetse-fly infested parts of Africa.—*H. N. Vinall*.

3299. DORCHESTER, C. S. A treatment to preserve valuable representative samples of ear corn. *Jour. Amer. Soc. Agron.* 14: 93-95. 1922.—Ears of corn dipped in white shellac were preserved much better than those dipped in a half and half solution of shellac and wood alcohol or in antimit as compared with ears not treated. The ears were protected from the Angoumois grain moth, from other insect pests, and from mice.—*F. M. Scheriz*.

3300. DORPH-PETENSEN, K. Snylteplanten Silke. [The parasite dodder]. *Ugeskr. Landmaend* 66: 566-567. 1921.—In the regulations of the Danish seed-testing station the allowance of 20 dodder seed per 100 gm. of seed has been diminished to 10 dodder seed, although dodder, as a rule, is of small importance in Denmark. In the last year, when a mild winter was followed by a hot summer, dodder was rather harmful in clover and alfalfa fields, much in the same way as in central and southern Europe.—*Ernst Gram*.

3301. DOWNING, R. G., and L. G. LITTLE. Wheat variety trials. Ten years' results (1911-1920) at Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 241-245. 1922.—Wheat has been a crop of secondary importance in the New England district because of (a) liability to rust, (b) wet summers which prevent production of a good wheat hay, (c) poor quality of flour, and (d) inferiority as a cash crop. The conditions (a) and (c) have been largely overcome by introduction of improved varieties. Clarendon and Early Haynes Blue Stem were the ranking varieties in regard to yield of grain. The latter and Glen Innes No. 2 were highest in the production of hay. Genoa averaged 18 bushels per acre for the 10-year period.—*L. R. Waldron*.

3302. DUNLAVY, HENRY. Frequency and importance of five-lock bolls in cotton. *Jour. Amer. Soc. Agron.* 13: 332-334. 1921.—Of the bolls of Watson Acala cotton grown at Italy, Texas, 73.38 per cent were 5-lock bolls. The latter were found to be 11.24 per cent heavier than 4-lock bolls, and are considered by the producer to be more valuable.—*F. M. Scheriz*.

3303. EARLE, F. S. Sugar-cane varieties of Porto Rico III. *Jour. Dept. Agric. Porto Rico* 5: 3-141. 1921.—The present is the last of a series of 3 papers published in this journal on sugar cane varieties in the Island. The 2 former papers were published in Vol. 3, April, 1919, and Vol. 4, July, 1921, respectively. For each important variety the name, synonyms, history, description of appearance, quality, characteristics, and place of cultivation are enumerated.—*C. Rumbold*.

3304. FERRIS, E. B. Report from South Mississippi Branch Experiment Station for 1921. *Mississippi Agric. Exp. Sta. Bull.* 201. 20 p. 1922.—The report gives results of variety tests with corn and cotton; fertilizer tests with corn, cotton, tomatoes, and sweet potatoes; rotations and cover crops, and cultural practices with different fruits at Poplarville in south Mississippi.—*J. Fred O'Kelly*.

3305. FINGERLING. Der gegenwärtige Stand der Einsäuerungsfrage. [The present status of the ensilage question.] *Mitteil. Deutsch. Landw. Ges.* 37: 309-314. 1922.—This is a recent address before the "feeds" section of the German Agricultural Society. The speaker set forth the biological principles governing the production of ensilage and described the American silo and its handling; the production of sweet silage ("Süßpressfutter"), and the use of electric current to raise the temperature of the green material to 50°C., as is necessary for the production of sweet silage. By the use of direct current an ensilage was produced from maize that could be fed in much greater quantities than is general, was eagerly eaten, and

caused a marked increase in the milk flow. Later, red clover ensilage was prepared by this method and produced perfect feed. The acetic acid content was only 0.2 per cent and that of lactic acid only 0.45 per cent. Two hundred pounds of green matter required 2-2.5 kilowatts of current to raise the temperature to 50°C.—A. J. Pieters.

3306. FRANK, FRANZ. Kartoffelbauversuche in Kärnten im Jahre 1921. [Potato culture experiments in Kärnten in 1921.] Oesterreich. Zeitschr. Kartoffelbau 2: 5-6. 1922.—The author reports competitive tests with English, German, and local varieties. The highest yielding English and German varieties were among those known to be susceptible to the wart disease.—F. Weiss.

3307. FRAPS, G. S. Digestibility of the sugars, starches, pentosans, and protein of some feeding stuffs. Texas Agric. Exp. Sta. Bull. 290. 21 p. 1922.—This bulletin deals with the quantity of sugars, starches, pentosans, and residual nitrogen-free extract of the nitrogen-free extract and their digestibility. The quantity of sugars in most feeds is comparatively small, many of them containing less than 3 per cent. The sugars are digested almost completely. The quantity of starch is low in roughages and high in concentrates. The digestibility of the starch is high in all feeds. The sugars, starches, and pentosans account for nearly all of the nitrogen-free extract of many of the concentrates, but for only a small part of the roughages. While the amount of amids is usually small, it may sometimes make up a considerable portion of the protein. The digestibility of the pentosans in the nitrogen-free extract is more variable than that of the starch and is generally lower, varying from 50 to over 60 per cent. The digestibility of the residual nitrogen-free extract was less than 40 per cent with 26 of the samples. It was more than 50 per cent with alfalfa hay, peanut hay, and other legumes.—L. Pace.

3308. FRAPS, G. S. Digestion experiments. Texas Agric. Exp. Sta. Bull. 291. 16 p. 1922.—The value of stuffs for feeding purposes depends on bulk, palatability, ash content, suitability to the animal, vitamin content, digestible protein, and productive value.—Tables showing results of tests are given for alfalfa hay, alfalfa meal, deliated cottonseed hulls, and those with lint on, sorghum (red top), corn bran, Darea (sorghum), milo (whole), milo (ground), rolled oats, oats (whole), oat-hull clippings, oatmeal mill by-products, peanut hulls, pinto beans, velvet beans in pods, and various wheat products already reported in a previous bulletin.—L. Pace.

3309. FRAPS, G. S. The effect of rock phosphate upon the corn possibility of phosphoric acid of the soil. Texas Agric. Exp. Sta. Bull. 289. 17 p. 1922.—Comparisons of Tennessee rock phosphate with Florida soft phosphate and dicalcium phosphate show corn possibilities of about 30, 34, and 52 bushels per acre as compared with 17 bushels with no phosphate. The 13 bushel increase should occur for several years as only 1.4 per cent of the phosphoric acid is removed by each crop.—L. Pace.

3310. FREEMAN, G. F., and R. E. DICKSON. Cotton variety experiments 1912-1920. Substation No. 7, Spur. Texas Agric. Exp. Sta. Bull. 288. 17 p. 1922.—This bulletin reports on methods of cotton culture, yields, and varieties grown on the Permian Red-beds region of Texas, lying below the cap-rock of the plains. Attention is called to those varieties giving the best results. As no cotton tested is ideal for this section, work is under way to develop a cotton suited to this region.—L. Pace.

3311. GERLACH. Zur Phosphorsäurefrage. [On the question of phosphoric acid.] Mitteil. Deutsch. Landw. Ges. 37: 192-195. 1922.—The author brings together the results from a number of experiments to show that before the war phosphoric acid was used in excess and that consequently on most fields there is at present a sufficient supply to warrant reducing the applications and thus save expense. He gives figures showing that the hectare yield of wheat and rye in 1921 was greater than the average of 1909-1913 in spite of the reduced use of artificial fertilizers.—A. J. Pieters.

3312. GILMORE, J. W., and L. J. FLETCHER. Desirable qualities of California barley for export. California Agric. Exp. Sta. Circ. 246. 11 p., 1 fig. 1922.—The report concerns the methods of threshing barley and the characteristics of good malting barley.—A. R. C. Haas.

3313. GRANTHAM, A. E. Some observations on the behavior of bearded and smooth wheats. Jour. Amer. Soc. Agron. 14: 57-62. 1922.—Bearded gave a higher yield than smooth wheats. Effects of fertilizers on the bearded and smooth wheats are compared. An average of 285 kernels of bearded wheat and 412 of smooth wheat weighed 10 gm. Excess of nitrogen seemed to affect the smooth more adversely than the bearded wheats.—F. M. Schertz.

3314. HACKLEMAN, J. C. Growing soybeans in Illinois. Illinois Agric. Exp. Sta. Circ. 255. 16 p., 12 fig. 1922.—Methods of culture and harvesting soybeans (*Soja max*) are discussed. Recommendations of varieties for different uses in various sections of the state are given.—O. H. Sears.

3315. HANSEN, F. Rodfrugtarter i Forhold til Jordbund og Gødskning. [Root crops in relation to soil and fertilization.] Ugeskr. Landmaend 66: 650-652. 1 fig. 1921.—Judging from results from 3 experimental fields, it is stated that on unfertilized soil mangolds are the poorest croppers. Poor soil, with a low amount of manuring, are better utilized by swedes and potatoes. For the manure applied mangolds pay better than swedes and potatoes, but heavy fertilizing of all of these crops is not economical.—Ernst Gram.

3316. HANSEN, H. J. Erfaringer vedrørende Frøavl af Græsmarksbælplanter. [Experiments with the production of legume seed for the pasture.] Nordisk Jordbrugsf. 1921: 90-98. 1921.—Most important is late red clover (*Trifolium pratense serotina*), but seed production has been practiced virtually only since the experiments of the last few years have shown the usefulness of late instead of early red clover, and since the native variety Hersnap has come into prominence. In 1921 the seed area was 400 hectares, but the State used as much seed as could be produced on 900 hectares. Even in a state as small as Denmark the localities are very different; moor and wet acid soils are not favorable, but otherwise both heavy and light soils are used. In order to secure the necessary number of bumblebees the area devoted to clover for seed should not be more than 3-4 hectares, and the fields should lie close to ditches, groves, and other homes of bumblebees. In order to avoid stem-rot (*Sclerotinia Trifoliorum*) and nematodes (*Tylenchus devastatrix*) clover should not be used more than once in an 8-year rotation.—Ernst Gram.

3317. HARRIS, F. S. Comment on R. S. Vaile's discussion of Utah results. Jour. Amer. Soc. Agron. 13: 316-317. 1921.—A polemic.—F. M. Schertz.

3318. HARTWELL, BURT L. Relative growth response of crops to each fertilizer ingredient and the use of this response in adapting a fertilizer analysis to a crop. Jour. Amer. Soc. Agron. 13: 353-359. 1921.—In this presidential address a grouping is given of agricultural crops showing their relative response to each of the fertilizer nutrients.—F. M. Schertz.

3319. HAUNALTER, EMIL. Die Gründüngung beim Kartoffelbau. [Use of green manures in potato culture.] Oesterreich. Zeitschr. Kartoffelbau 2: 13-14. 1922.—Use of leguminous green manure crops particularly of blue lupine, in the rotation preceding potatoes gives excellent results in Austria.—F. Weiss.

3320. HELIOS, SCOETTA. Frumenti di Cirenaica. [The wheats of Cyrenaica.] Gior. Agric. Domenica 31: 35. 3 fig. 1921.—Descriptions and notes are given of the 3 best varieties in Cyrenaica, namely, Mogarbia, Misko, and Screisra.—C. E. Leighty.

3321. IOSA, G. II "Cignarellone" del Molise. [The Cignarellone (wheat) of Molise.] Italia Agric. 58: 1-5. 4 fig. 1921.—This variety of wheat, grown in Molise (south-central

[Italy) at 600-800 m. elevation, is described. Results of comparative-yield tests, and chemical analysis of the grain are reported. Flour from this wheat is desirable for pastry making.—*C. E. Leighty.*

3322. IPPOLITO, G. n'. Sulla fertilizzazione del seme di frumento. [Studies upon the fertilizing of wheat seed.] *Staz. Sper. Agrarie Ital.* 54: 248-255. 1921.—Experiments are related in presoaking of wheat seed in solutions of K_2HPO_4 , $CaHPO_4$, Na_2HPO_4 , $(NH_4)_2HPO_4$, $Ca(NO_3)_2$, NH_4NO_3 , KNO_3 , K_2SO_4 , $MnSO_4$ (0.05-0.30 parts per 1000) of various concentrations in the hope of investigating the truth of the alleged increases in the yield of seed so treated. Comparative tests showed that all salts except $MnSO_4$ were of no value, and that simple water proved most efficient. $MnSO_4$ was found to produce a considerable increase in the yield of seed of plants arising from treated grain.—*A. Bonazzi.*

3323. JANCHEN, ERWIN. Einige Beobachtungen an schottischen Kartoffelsorten. [Observations on Scotch potato varieties.] *Oesterreich. Zeitschr. Kartoffelbau* 2: 3-4. 1922.—The English potato varieties introduced into Austria in 1921 to improve domestic seed stocks are described and compared as to value with local varieties. The dry summer proved especially unfavorable to most of them as compared with German and Austrian potatoes, but some of the English wart immune varieties yield as well as the susceptible Up-to-Date, and their further extension in Austria is greatly to be desired. Some of the Irish potatoes were severely affected with Spongospora scab but owing either to unfavorable soil conditions or the dry season this disease was absent in their progeny.—*F. Weiss.*

3324. JONES, J. M., and R. A. BREWER. Grain sorghums versus corn for fattening lambs. *Texas Agric. Exp. Sta. Bull.* 235. 23 p. 1922.—The object of this 90-day test was to compare the gains and economy of gains made by lambs fattened on the grain sorghums and on corn. Tables show rations used, composition, cost, weather conditions during test, and comparisons of the various combinations of Kafir, feterita, milo, and cottonseed with corn. In this test, as in the previous one, lambs fed on milo made slightly larger average daily gains than those fed on corn. Those fed on Kafir gained more than those fed on milo. Those fed on milo, cottonseed and alfalfa hay made the largest gains.—*L. Pace.*

3325. JOYCE, T. A. Yerba Maté. Light on old records from Sir Herbert Gibson. *Pan Amer. Mag.* 34: 27-28. 1922.—The article contains brief historical data relative to the discovery and first use of maté. This information was communicated by letter from Sir Herbert Gibson to the author upon the publication of his monograph on maté [*Pan Amer. Mag.* 33: 307-328. 1921].—*M. R. Burr.*

3326. KARPEN, R. E. The blueweed and its eradication. *Texas Agric. Exp. Sta. Bull.* 292. 18 p. 1922.—The blueweed (*Helianthus ciliaris*), a perennial with horizontal underground root stalks, is regarded as the worst weed pest in west Texas. It is also found in western Oklahoma, New Mexico, and Arizona. It barely survives in pastures but when these are plowed it at once grows vigorously. The seed are of low vitality, only 20 out of 1950 germinating, 1 of these after 109 days. Experiments in eradication by various methods are reported.—*L. Pace.*

3327. KIRKPATRICK, ROY T. The approved seed plan of the Missouri Corn Growers' Association. *Jour. Amer. Soc. Agron.* 13: 330-332. 1921.—The plan is given and discussed.—*F. M. Schertz.*

3328. LANG, EMIL. Der Ertragsverlauf in der Landwirtschaft bei steigendem Aufwand. [The course of returns in agriculture with increasing expenditures.] *Landw. Jahrb.* 55: 337-407. 1920.

3329. LEIPZIGER. Deutschlands Bedarf an Klee und Grassaaten im Hinblick auf die eigene Erzeugung und die Ein- und Ausfuhr. [Germany's requirements in clover and grass

seed with reference to domestic production and imports and exports.] *Mittel. Deutsch. Landw. Ges.* 37: 299-300. 1922.—After pointing out the unsatisfactory state of statistics and the difficulties of arriving at accuracy, the author gives 2 tables. In these he estimates the requirements, domestic production, and quantities available for export or needed for import of clovers, alfalfa and similar crops, and the principal grasses. With the exception of alfalfa and sweet clover (only insignificant quantities of the latter being used) Germany has a surplus of leguminous seed for export. Some of all grasses (except *Dactylis glomerata* and *Festuca ovina*) must be imported.—A. J. Pieters.

3330. LEVY, E. BRUCE. The grasslands of New Zealand. *New Zealand Jour. Agric.* 23: 321-330. 10 fig. 1921.—The principles of pasture establishment are given.—N. J. Giddings.

3331. LEVY, E. BRUCE. The grasslands of New Zealand. *New Zealand Jour. Agric.* 24: 8-14. 6 fig. 1922.—The author recommends a grass mixture for swamp lands not subject to flooding. The sweet floating grass (*Glyceria fluitans*) has been found very desirable on lands which are sometimes under water.—N. J. Giddings.

3332. LIER, O. En redegørelse vedrørende frøavl av engbelgvekster i Norge. [An account of the production in Norway of seed of pasture legumes.] *Nordisk Jordbrugsf.* 1921: 85-89. 1921.—Of the late red clover (*Trifolium pratense scrotilina*) a good deal is produced locally on lots set apart from the 2nd year pasture or, if sufficiently uniform and free of weeds, from the 1st year pasture, which yields more and better seed. A few growers have in later years layed out pure clover for seed, producing very prominent local varieties for sale. Alsike (*T. hybridum*) is as extensively produced as red clover and in mixture with this. About 10 per cent of the annual requirement of clover seed is imported.—Ernst Gram.

3333. LÜHNING. Zeitgemässe Fütterungslehre. [Timely feeding doctrine.] *Mittel. Deutsch. Landw. Ges.* 37: 297-298. 1922.—It is shown that the cattle breeder can not succeed without abundant and good pastures properly seeded to grasses and clovers.—A. J. Pieters.

3334. McDONALD, A. H. E. The production and breeding of wheat. *Agric. Gaz. New South Wales* 33: 305-309. 1922.—Emphasis is placed on the proper choice of varieties and the importance of summer fallowing in New South Wales where rainfall is less than 15 inches during the growing period. Use of a proper rotation is urged.—General principles of breeding are discussed insofar as they relate to the production of new wheat varieties.—J. R. Waldron.

3335. MCGOWAN, H. E. Commercial potato growing. *New Zealand Jour. Agric.* 23: 336-340. 3 fig. 1921.—Digging, grading, storing, and marketing of potatoes are discussed.—N. J. Giddings.

3336. McMAHON, THOS. J. The sugar industry of the Crown Colony of Fiji. *Internat. Sugar Jour.* 24: 240-243. 1922.—An account is given of the political and economic life of this British colony, which has been growing rapidly since the building of the Panama Canal. The country is well suited to sugar cane culture, averaging 30 tons of cane to the acre and on river lands often 60 tons. Sugar cane grows wild in Fiji. One variety, called "Dovu" by the Fijians, is used as food; another called "Vico" has little value. Neither has been cultivated. The cultivated canes are Badila, Malabar, Rose Bamboo, and Striped Singapore.—C. Ruessold.

3337. MAGNUS, HANS. Theorie und Praxis der Strohaufschliessung. [Theory and practice of processing straw.] 43 p. Paul Parey: Berlin, 1919.—The author briefly refers to some of the earlier efforts at processing straw and states that in 1 month of 1918 a total of 10,000 tons of straw was processed in various ways. Kelner is quoted to the effect that 100 kgm. crude straw has 11 kgm. starch value whereas concentrated straw has 45-50. G. Fingerling claims that well processed straw has 70 per cent starch value. On the basis of a 55 per cent

yield in weight and a 60 per cent starch value 100 kgm. of crude straw when processed will have 33 kgm. starch value against 11 kgm. in the crude straw.—The most recent and best method is the Beckmann patented process. To fine cut straw is added 8 times the amount of a $1\frac{1}{2}$ per cent caustic soda solution. After standing 4 hours the pickle is poured off and the processed straw washed to remove the traces of alkali. The pickle then contains about $\frac{1}{2}$ the original NaOH and can be used again by adding fresh 6 per cent NaOH. This can be done not to exceed 3 times because the pickle becomes so saturated with dissolved lignin material that it is inactive. In this way, 24 per cent NaOH serves three charges at 12 per cent strength, a net consumption of 8 per cent NaOH for each charge. The theoretical considerations governing the processing of straw are developed in detail. Briefly the object is to treat the straw enough to remove as much lignin as possible while keeping the loss of digestible organic substances as low as possible. Processing under high temperatures affects the digestible organic substances more than it does the lignin; consequently the cold process is preferred. Figures are given showing the results in yield and loss of lignin, cellulose, etc., when straw is processed by various methods. Soda or CaO, both in 8 or 10 per cent solutions and boiled without pressure 3-5 hours, can be used with results nearly as good as those secured by the Beckmann method with NaOH. Processing straw with soda without heat or at a moderate temperature failed, while boiling under pressure was too destructive of digestible organic matter. Boiling cut straw with 8 per cent soda for 3 hours without pressure gave a yield of 74 per cent as against 73 by the Beckmann cold process and caused a loss of 13.29 per cent of the digestible organic materials as against a loss of 12.1 per cent by the Beckmann process. The great advantage of the soda process lies in the fact that "soda" (carbonate of soda) can be shipped in sacks while caustic soda must be shipped in iron containers. The caustic soda is also more dangerous to handle. No figures are given showing the cost of these processes in material and labor.—A. J. Pieters.

3333. MAHOOD, JOHN A. Pastures and dairy industry in Florida. Florida Agric. Dept. Quart. Bull. 32: 81-88. 1922.—Popular.—J. C. Th. Uphof.

3339. MAKIN, R. N. Fodder crops for dairy farmers. Southern tableland. Agric. Gaz. New South Wales 33: 317-319. 1922.—More attention should be given to fodder crops and pastures. Irregular precipitation renders yields of fodder crops uncertain unless preceded by summer or winter fallow. Oats make an excellent fodder crop and certain harley varieties are good. Japanese millet is of greatest value as a catch crop. More alfalfa should be grown. Red clover can be grown on soils too heavy for alfalfa. A sowing table is given.—L. R. Waldron.

3340. MAURIN, E. Augmentation de l'isosulfocyanate d'allyle (sénévol allylique) dans la moutarde noire par l'action fertilisante du soufre. [Increase of allylisosulphocyanate (allyl senevol) in black mustard by the fertilizing action of sulphur.] Bull. Sci. Pharm. 24: 76-78. 1922.—The addition of sulphur to the soil increases not only the quantity of mustard seed but also the amount of mustard oil; thus the seed from plants grown under ordinary conditions yielded 0.9 per cent of mustard oil, whereas the seed from plants grown in soil to which sulphur had been added yielded 1.0 per cent of oil.—H. Engelhardt.

3341. MELOY, G. S. Meade cotton, an upland long-staple variety replacing Sea Island. U. S. Dept. Agric. Bull. 1030. 24 p., 11 pl. 1922.—The large growth and late maturity of Sea Island cotton renders this species susceptible to a great deal of injury by the boll weevil. During the last 10 years the annual production has decreased from 90,000 to 2,000 bales. The destruction of the Sea Island cotton industry was anticipated before the weevil reached the southeastern part of the U. S. A., and steps by the U. S. Department of Agriculture were taken to develop an early small-growing type. After efforts to develop an earlier strain of Sea Island failed, Meade, an upland variety, was brought under experiment. The Meade variety has plant characteristics of the upland type, but the fiber and nakedness of the seed are characteristic of the Sea Island. The staple of the Meade in all practical respects is

equivalent and of equal value to the Sea Island staple. The advantage the former has is in the early fruiting habit and small vegetative growth. The Meade variety is not the result of hybridization but has been developed by selection, originally made by Roland Meade in 1921 at Clarksville, Texas, from a local variety known as Black Rattler. Progress has been made in developing this Sea Island substitute, but insect pollination from other varieties and the mechanical mixing of seed at public gins are the chief causes for the occurrence of inferior and off-type plants. The roguing out of undesirable plants and selection must be continued in order to get the best uniform type of lint and the necessary early fruiting habits for boll weevil conditions.—*J. O. Ware.*

3342. MEYER, L. Einige Erfahrungen mit Gründüngung im östlichen Deutschland. [Some experiences with green manuring in eastern Germany.] *Mittteil. Deutsch. Landw. Ges.* 37: 422-424. 1922.—The author presents a general record of personal experiences on a stiff clay soil. He describes his use of red and alsike clover, lupines, medic, and serradella.—*A. J. Pieters.*

3343. MILLIGAN, S. Proceedings of the Board of Agriculture in India. 135 p., 1 pl. Government Press: Calcutta, 1922.—This is a report of the proceedings of the 12th meeting of the Board of Agriculture, held at Pusa, February, 1922. It contains an address by the President, S. Milligan, Agricultural Adviser to the Government of India, and discussions and resolutions on the following subjects: Progress of agricultural education in middle schools; the line of demarcation between agriculture and industry; the proposal to prohibit export of certain manures from India; measures to be adopted to secure continuity in permanent field experiments; measures for famine relief; manufacture of nitrogen-fixation products in India; cattle breeding and related problems; motor traction cultivation; need for the study of the problem of nitrates in the soil; and improvement of the potato (*Solanum tuberosum*) crop. Opinions of various officials on the above topics are given in appendices.—*Winfield Dudgeon.*

3344. MILLIGAN, S. Review of agricultural operations in India, 1920-21. 120 p., 3 pl. Government Press: Calcutta, 1922.—This non-technical summary of the progress of Indian agriculture includes: Economic work on important crop plants; investigations on soils, fertilizers, sugarcane, and crop diseases; agricultural engineering; agricultural education; the cooperative movement as affecting agriculture; live stock; and expenditure of the various agricultural departments. Appendices give: Areas under new and improved varieties of crops in 1920-21; list of agricultural stations in British India; list of agricultural colleges and schools; operations of non-credit agricultural cooperative societies; and a list of 136 publications on agricultural subjects in India during the year under review.—*Winfield Dudgeon.*

3345. MITSCHERLICH, E. A. Zur Überwindung des v. Liebig'schen Gesetzes vom Minimum. [Overcoming Liebig's law of the minimum.] *Landw. Versuchssta.* 97: 23-26. 1920.—This is in reply to an article by Adolf Mayer [*Ibid.* 96: 247-250. 1919].—It is pointed out that to determine the influence of any factor either in a physical problem or in plant growth it is necessary to maintain the other factors constant. If all but 1 factor influencing plant growth are constant and this 1 factor varied, the change in yield from the maximum yield is due to the change in this factor. Expressed by an equation it is, $\frac{dx}{dy} = (A-y).C$, where y is the increase in yield above the high yield A , which varies in proportion to the change in the growth factor X . C is the proportionality factor. This equation indicates nothing more for 1 factor, which is proportional to the minimum, than it does for all growth factors in the same way, and is therefore in contrast to the "law of minimum" of Liebig. Integrated the formula is, $\log(A-y) = \log A - cx$, or $y = A(1 - e^{-cx})$, and finally, $y = E(1 - e^{-cx}).(1 - e^{-cx})^2.(1 - e^{-cx})^3$, etc., which is of general application.—*R. O. E. Davis.*

3346. MOOERS, C. A. The agronomic placement of varieties. *Jour. Amer. Soc. Agron.* 13: 337-352. 1921.—In this presidential address certain improvements are suggested for increasing the scientific accuracy of varietal trials.—*F. M. Schertz.*

3347. MORANA, EMILIO K. Comparative tests of thirty-two varieties of corn. Philippine Agric. 9: 209-217. 1921.—These tests were made at Los Baños, Philippine Islands, and included observations of size, shape, and position of ears, length of growing season, size of plants, percentage of sterile plants, yields during dry and rainy seasons, and shelling percentage.—Sam F. Trelease.

3348. MORRIS, G. W. The F. A. Q. wheat. Four years' samples compared. Agric. Gaz. New South Wales 33: 311-313. 1922.—Samples of wheat from the Grain Trade Section, Sydney Chamber of Commerce, used in fixing standards for shippers and merchants, were milled and graded and comparisons made for the 4 years. Chemical analyses are presented. A slight deterioration in quality is noticed for the past 2 years.—L. R. Waldron.

3349. NOLTE, O. Die Wirkung steigender Kaligaben. [The action of increasing amounts of potash.] Mittell. Deutsch. Landw. Ges. 37: 424-428. 1922.—The author makes a plea for the increased use of potash. The tables give details of fertilizers, yields, profits, and phosphoric acid content of the crop for rye, winter wheat, winter barley, summer wheat, summer barley, oats, *Vicia faba*, peas, sugar and cattle beets, and potatoes. In a few cases only was there a money loss from the use of 200-300 kgm. per hectare of potash. In most cases the crops fertilized with potash contained more phosphoric acid than those not so fertilized.—A. J. Pieters.

3350. PARR, A. E. Report of the agricultural stations of the Western Circle, United Provinces of Agra and Oudh (India), for the year ending 31st May, 1921. 85 p. Government Press: Allahabad, 1921.—This report covers the work of 9 government experimental farms. The main work is the testing of varieties, and of methods of cultivation of cotton (*Gossypium* spp.), wheat (*Triticum vulgare*), sugar cane (*Saccharum officinarum*), and other crop plants important in the western part of the United Provinces. Details are given for the various experiments.—*Pluchea lanceolata*, a common and troublesome weed, growing 1.5-2 feet high, with roots extending straight downward 22-25 feet, damages low crops by shading them. Grazing cattle will not eat it, and cultivators regard it as harmful to cattle. The experiment was tried of using it for fodder. Bullocks fed on a ration of half ordinary fodder and half *Pluchea* came to show a distinct preference for it, and gained more weight and looked better than those fed entirely on ordinary fodder.—Winfield Dudgeon.

3351. PERRET, CL. La dégénérescence des pommes de terre. [Degeneration of Irish potato.] Bull. Soc. Path. Vég. France 9: 39-41. 1922.—The foreign varieties introduced at Merle in central France suffered much from the spring drought of 1921. In certain localities of the Monts du Farez a domestic variety, the Violette, cultivated for 50 years without renewal and without selection has not degenerated.—J. Dufrénoy.

3352. PITT, J. M. Farmers' experiment plots. Agric. Gaz. New South Wales 33: 260-264. 1922.—Mangels were under trial in the Mt. George region and garden peas in the Manning River district. Heavy rains and rich soils accounted for yields of mangels of nearly 50 tons per acre. The outstanding variety of peas was Greenfeast.—L. R. Waldron.

3353. POWERS, W. L., and W. W. JOHNSTON. Irrigation of alfalfa. Oregon Agric. Exp. Sta. Bull. 189. 38 p., 24 fig. 1922.—Alfalfa is the leading irrigated crop. Directions are given as to the best method of irrigation, time, frequency, and amount of application. Data are given on duty-of-water experiments, and on maximum yields and maximum net profits with varying amounts of water.—C. E. Owens.

3354. PRIORHAM, J. T. Pryor barley. Agric. Gaz. New South Wales 33: 238. 1922.—This early variety of barley probably came originally (unnamed) from Chili. It resembles a cross grown in New South Wales which originated from Kinver \times *Hordeum spontaneum*. Pryor is suited to the warmer districts of New South Wales.—L. R. Waldron.

3355. REITMAIR, OTTO. Die Verwendung von Kunstdüngern im Kartoffelbau. [The use of artificial fertilizers in potato culture.] Oesterreich. Zeitschr. Kartoffelbau 2: 9-10. 1922.—Requirements of Austria's soils for potato culture are discussed from the standpoint of the fertilizer materials now available and the market prices thereof.—*F. Weiss.*

3356. REYNOLDS, MARK H. Fodder crops for dairy farmers. Northwestern districts. Agric. Gaz. New South Wales 33: 319-321. 1922.—The main problem is to provide succulent fodders for the season when natural pastures are dry. The most important crop is alfalfa. Sudan grass and sorghum do very well and can be recommended. If maize is used it should be sown early, either thinly broadcasted or in drills. Sowing of cereals in March can be advised. Rape, mustard, and root crops are advisable under certain conditions. A table giving best dates of sowing and other information is appended.—*L. R. Waldron.*

3357. RIVERA, VINCENZO. Sopra le condizioni di sviluppo di alcuni semi di leguminose e la funzione del guscio. [Studies on the conditions of germination of some legume seeds and on the function of the pod.] Mem. R. Staz. Patol. Veg. Roma [1922:] 3-12. 1922.—A copy of this paper is to be found in Rivista di Biologia 4: 1922. Studies are related upon the absorption of water by naked seed of *Onobrychis sativa* and by seed still in the pod. The loss of water from these 2 types of seed, after having been in the moist chamber, is also studied. It is found that the pod acts as a strong water absorbent from the soil, so that the seed in the seed-chamber is evenly moistened and is protected against too rapid and protracted changes in the moisture content of the environment. The protection is not limited to the pre-germinative period but extends also to the post-germinative period, when the young succulent organs are easily injured by lack of moisture. The conclusion is reached that in practice the seed of *Onobrychis* should not be removed from the pod before seeding.—*A. Bonazzi.*

3358. ROJALES, PEDRO S. Distribution of abaca in Cavite Province as related to soil and climate. Philippine Agric. 9: 219-232. 1921.—The abacá (Manila hemp) growing section of Cavite Province (Philippine Islands) is sloping, and success of cultivation varies with altitude and exposure. The study includes observations on rainfall, temperature, typhoons, and soil conditions.—*Sam F. Trelease.*

3359. ROTHEA. Étude de quelques produits alimentaires du Pérou (Lima). [Investigation of some food products of Peru (Lima).] Bull. Sci. Pharm. 24: 134-138. Fig. 7. 1922.—An account is given of a microscopical and chemical examination of 2 samples of potatoes, chino blanco and chino negro, dried in the cold, samples of quinoa (*Chenopodium quinoa*), occa (*Oxalis tuberosa*), and corn. It was found that the potato known as chino blanco was more valuable as a nutrient than chino negro. The seed of *Chenopodium quinoa* is rich in nitrogenous and amylaceous substances, and is an excellent nutrient. The plant is grown together with potatoes on the higher plateaus where corn cannot be cultivated. Occa, a rhizome, is rich in nitrogenous substances, sugars, and starch. The starch grains have a characteristic shape.—*H. Engelhardt.*

3360. ROTHEGEB, BENTON E. Cultural experiments with grain sorghums in the Texas Panhandle. U. S. Dept. Agric. Bull. 976. 43 p., 11 fig. 1922.—Date-of-seeding, rate-of-seeding, and environmental experiments during the period from 1914 to 1919 are reported, previous work having been presented in U. S. Dept. Agric. Bull. 698. On account of varying seasonal conditions no one date of seeding is best for all years, although the average yield over a series of years is a safe basis upon which to work. Dwarf Milo gave best average yields when seeded about May 23, Dawn kafir when seeded early, May 10, and Manchu Kaoliang when seeded late, about June 10. However, all varieties did not give highest average yield from the same date of seeding. Dwarf Milo has proved to be the best variety in this section. Grain crops spaced 3½ feet apart will produce a higher average total crop yield, but spacing 7 feet apart is a surer way of securing a crop. Source of seed had practically no effect on growth and its effect on composition of the crop was far less than the effect of soil and climate and other environmental conditions.—*Ward H. Sacks.*

3361. SCHMOEGER, MAX. Felddüngungsversuche ausgeführt auf Veranlassung der Dünger-Abteilung der D. L. G. in den Jahren 1903 bis 1917 von der Landwirtschaftlichen Versuchstation Danzig. [Field fertilizer experiments carried out at the suggestion of the fertilizer section of the German Agricultural Society in the years 1903-1917 by the agricultural experiment station at Danzig.] Arbeit. Deutsch. Landw. Ges. 304. 103 p. 1920.—A critical report is made on fertilizer experiments on potatoes, oats, sugarbeets, wheat, rye, clover and grass, and barley.—A. J. Pieters.

3362. SCHNEIDEWIND. Versuche über das Phosphorsäuredüngebedürfniss der Böden. [Investigations on the phosphoric acid requirements of soils.] Mitteil. Deutsch. Landw. Ges. 37: 56-57. 1922.—A 1-season test on soils previously heavily manured showed that the addition of phosphoric acid had no effect or only a very slight one.—A. J. Pieters.

3363. SCHUBERT, JOSEF S. Etwas über Sortenwahl und Sortenwechsel im Kartoffelbau. [Concerning selection and exchange of varieties in potato culture.] Oesterreich. Zeitschr. Kartoffelbau 2: 1-3. 1922.—The author discusses distribution of potato culture in Austria from the standpoint of soil types, yield, and varieties grown. He classifies varieties with respect to resistance to blight, scab, and wart diseases.—F. Weiss.

3364. SCHURIG. Wie wird durch Gründüngung und tiefe Bodenbearbeitung der Wasservorrat des Bodens und somit der Ertrag beeinflusst? [How is the water supply of the soil and consequently the yield effected by green manuring and deep working of the soil?] Mitteil. Deutsch. Landw. Ges. 37: 189-192. 1922.—The author points out the dependence of plant growth upon water and the importance of conserving it since fertilizers can only give good results in the presence of an abundant supply. He shows how this may be done by cultural methods. On heavy soils green manuring must be practised with discretion since in dry seasons the green manure crop may so exhaust the reserve water supply as to decrease the next crop.—A. J. Pieters.

3365. SCOFIELD, C. S., T. H. KEARNEY, C. J. BRAND, O. F. COOK, and W. T. SWINGLE. Production of American Egyptian cotton. U. S. Dept. Agric. Bull. 742. 30 p. 1919.—The authors describe the development of the American Egyptian cotton industry in Arizona through cooperation between members of the Bureaus of Plant Industry and Markets, constituting the "Committee on Southwestern Cotton Culture" of the U. S. Department of Agriculture, and associations of cotton growers in the Salt River valley. The topics treated are: characteristics and uses of the Egyptian type of cotton, production in Egypt and America, earlier experiments in the U. S. A., breeding work which led to the development of new varieties in Arizona, cooperative organization of growers, labor supply, ginning, grading and marketing the crop, maintenance of pure planting seed, agricultural relationships of crop, cultural methods, insect enemies, and diseases.—T. H. Kearney.

3366. SHEPHERD, A. N. Farmers' experiment plots. Hay trials on Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 33: 247-249. 1922.—If early seeding is practiced upon moist soils, 1 irrigation is usually sufficient. Trials were made using both wheat and oats as hay producers. With wheat, Improved Steinwedel, Gresley, and Canberra varieties gave highest yields of hay. Among oats, Algerian ranked highest in hay yield.—L. R. Waldron.

3367. SIEVERS, H. F., and J. H. SHADEN. The preparation of an edible oil from crude corn oil. U. S. Dept. Agric. Bull. 1010. 25 p., 7 fig. 1922.—This bulletin reports results of experiments designed to show the most satisfactory and economical methods of preparing an edible oil from crude corn oil. It also considers the economic aspects of the processes now employed, together with the modifications proposed, and includes a detailed plan of an equipment for a commercial refining plant capable of handling 2 batches of 25,000 pounds of oil a week. The cost of refining corn oil in such a plant is said to be approximately 1.6 cents a pound.—J. W. Read.

3368. SKERRETT, R. G. America's domestic food supply. *Sci. Amer.* 126: 6-7. 1922.—An inventory is given of the needs and the facilities for producing food to supply them.—*Chas. H. Otis.*

3369. SPARKS, G. C., and A. N. SHEPHERD. Farmers' experiment plots. Wheat experiments. *Agric. Gaz. New South Wales* 33: 229-237. 1922.—In the Southern district experiments were conducted upon 18 private farms. Weather conditions were only fairly favorable. The maximum yield of 38.5 bushels was secured from Bomen wheat. Canberra wheat gave excellent results, as usual, but yields from Federation were comparatively low. All manured plots gave satisfactory increases of yield as against no manure. Yields secured near Murrumbidgee under dry-land conditions showed the possibility of successful wheat cropping during the more favorable years.—*L. R. Waldron.*

3370. SPILLMAN, W. J. A plan for the conduct of fertilizer experiments. *Jour. Amer. Soc. Agron.* 13: 304-309. 1921.—The author proposes a plan whereby direct comparisons are possible and illustrates the plan by 3 series, using nitrogen, phosphorus, and potassium fertilizers.—*F. M. Schertz.*

3371. STEWART, GEORGE. Varietal nomenclature of oats and wheat. *Jour. Amer. Soc. Agron.* 13: 318-323. 1921.—Numbers when used as part of the name of a commercial variety are awkward, and dangerous as far as accuracy is concerned. Long names should be avoided either by using one part of the name or compounding a part of one of the name words with a part of the other.—*F. M. Schertz.*

3372. TACKE, ÜBER Torfstreu und den Wert des Torfstreudüngers. [Regarding turf litter and the value of turf litter manure.] *Mitteil. Deutsch. Landw. Ges.* 37: Flugblatt 20. 1922.—A general discussion is presented.—*A. J. Pieters.*

3373. TACKE, BR. Mitteilungen über die Arbeiten der Marschkulturkommission. [Contributions concerning the work of the moor culture commission.] *Landw. Jahrb. Ergänzungsband* 54: 348 p. 1920.—The author reports investigations carried out under the direction of the commission, including reports on fertilizers, drainage, rotations, meadows and permanent pastures, and other agronomic subjects.—*A. J. Pieters.*

3374. TOWNSEND, C. O. Climate and sugar beets. *Facts about Sugar* 14: 304-305. 1922.—Success in sugar beet growing depends upon the climatic conditions, temperature, moisture, light, and wind. A high percentage of sugar will not be stored in the roots unless there is a marked difference between the day and night temperatures. Beets require considerable moisture but too much results in a second growth with low sugar content. Strong winds are often injurious. In a new locality, sugar beets should be tested for a number of years before trying them on a large scale.—*C. W. Edgerton.*

3375. VAILLE, R. S. The interpretation of water-requirement data. *Jour. Amer. Soc. Agron.* 13: 311-316. 1921.—The principle is supported that the acre inch of water should be used as a unit in measuring water economy.—*F. M. Schertz.*

3376. WENHOLZ, H. Summer leguminous crops. Cowpeas, soybeans, and velvet beans. *Agric. Gaz. New South Wales* 33: 323-331. 1922.—These annual leguminous crops are especially valuable as they tolerate more or less acid soil conditions. Aside from the general role of soil improvers, cowpeas are particularly valuable as a hay crop, soy beans as a grain crop for pigs, particularly for hogging down, and velvet beans are useful as a catch crop for winter grazing. Each crop is discussed in some detail relative to varieties, methods of culture, and utilization.—*L. R. Waldron.*

3377. WIGGANS, R. G. Home-grown and imported red clover seed. *Jour. Amer. Soc. Agron.* 13: 334-335. 1921.—Plots from Italian, French, and Michigan grown clover seeds

were compared as to winterkilling and yield per plot. Native grown (Michigan) clover was found to be superior.—*F. M. Schertz.*

3378. WIGGANS, ROY GLEN. A classification of the cultivated varieties of barley. Cornell Agric. Exp. Sta. Mem. 46. 365-456. 5 pl., 21 fig. 1921.—The paper presents a summary of the previous classifications of barley and a discussion of the gross morphological features of barley. In attempting to classify the cultivated barleys, 627 named representatives were obtained from various sources and grown through a period of 5 years. The classification is based on morphological characters. Sixty varieties have been distinguished in the 4 cultivated species; 3 in *Hordeum intermedium*, 20 in *H. distichon*, 29 in *H. vulgare*, and 8 in *H. deficiens*. No consideration was given to yield and, undoubtedly, there are strains within the variety which differ as regards yield.—*L. Knudson.*

3379. WILLIAMS, C. B. Report of the division of agronomy. Ann. Rept. North Carolina Agric. Exp. Sta. 42: 17-33. 1921.—A statement is given covering results of fertilizer experiments at the several test farms together with results of seed selection in the improvement of corn, cotton, wheat, and rye.—*F. A. Wolf.*

3380. WILLIAMS, D. W., and O. E. McCONNEL. Rice bran for fattening hogs. Texas Agric. Exp. Sta. Bull. 286. 15 p. 1922.—The test shows that rice bran can be fed safely with equal parts of corn chops and 10 per cent tankage, and in all probability can be fed in as high a proportion as 60 per cent without resulting in carcasses graded soft.—*L. Pace.*

3381. WIRRE, H. Fröodlingen av vallbäljväkster i Sverige och några erfarenheter och iagttagelser beträffande densamma. [Production of legume seeds in Sweden and some experiences connected therewith.] Nordisk Jordbrugsf. 1921: 71-84. 1921.—Sweden needs annually 11,000,000 kgm. of seed for pasture, 40-50 per cent of which are estimated to be clover and other legume seed. Of red clover (*Trifolium pratense*) all seed needed of the late variety is grown in the state, but the production is rather varying, e.g., when heavy rains inhibit the pollination by bumblebees. If conditions are not particularly favorable a dense stand is also apt to decrease the seed output. When drilled in rows the crop is more easily kept free from weeds, but it also seems to be more susceptible to the attacks of clover stem-rot (*Sclerotinia Trifoliorum*) when compared with the fields sown broadcast. When drilled in rows 30 cm. apart the output has been a little higher than when broadcast, but hardly enough to pay for the work. It has been advised to mow the fields in spring in order to produce a more uniform seed crop, but in most cases this has proved a failure. The effect of top dressing with potassium and phosphate is undecided. The harvest should be made when the heads are wilted but the stalks still green. The colour of the seed is not only influenced by time of harvesting but is also a variety character and good types may be bred from yellow and violet seed as well. Alsike clover (*Trifolium hybridum*) is grown for seed in most parts of the state, mainly for home use.—*Ernst Gram.*

3382. WITTMACK, L. Ringelkletten in deutschen Wollen. [Burs in German wools.] Mitteil. Deutsch. Landw. Ges. 37: 282-285. 1922.—The author describes the occurrence of fruits of *Xanthium spinosum* and *Medicago* species mostly in wool of foreign origin. It appears, however, that since the war, and especially in 1921, considerable quantities of seed of *Medicago minima* have been cleaned out of German wool, particularly that coming from Pommern. A detailed description of this species is given together with suggestions for preventing the occurrence of the fruits in the wool.—*A. J. Peters.*

3383. WUTTRICH, E. The sugar industry in Natal and Zululand. Internat. Sugar Jour. 24: 243-247. 1922.—Sugar cane is cultivated along the coast of Natal and Zululand for more than 240 miles, 80 miles south of Durban, and 160 miles north of the city.—The rainfall of Natal averages 40 inches,—minimum 26, maximum 71. The maximum shade temperature is 116°F., the minimum 33. The crushing season in Natal and Zululand extends from May to

the end of January.—As a rule the whole stick is planted. Two sticks of cane are thrown side by side in a furrow and cut into short pieces. These are then covered to a depth of 4 inches by hoeing. Weeding between plants is done by hand, between furrows by a pony-plow and scarifier.—In Zululand the cane is burnt before being cut; in Natal this method is not followed. Ratooning is repeated, sometimes 7 times and more. Practically only one variety of cane is cultivated, the *Uba*, the origin of which is almost certainly Poona, India. It is a strong, drought-resisting, deep-rooting cane. Both plants and ratoons of *Uba* cane mature in Natal in 16-24 months. In parts of Zululand the plant cane matures in the "flats" in 14 to 18 months, ratoons in 12-16 months.—Insufficient care is given to the selection of seed cane. In one district of Natal the yellow stripe disease exists to an extent probably not exceeded elsewhere in the world. In another part are found the red, smut, and vascular diseases.—While it is impossible to give average figures, the minimum and maximum yields for Natal are about 10 and 40 tons per acre. In Zululand on the "flats" near the rivers, yields as high as 50 tons have been obtained.—*C. Rumbold*.

3384. YEH, YUEN TING. [Meade.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2: 199-206. 1921. [Text in Chinese.]—The author reviews the history and origin of Meade cotton; describes its characteristics; gives statistics on production; compares it with the Sea Island cotton; and discusses the possibilities of growing Trice in China.—*Chunjen C. Chen*.

3385. YEH, YUEN TING. [Problems of growing cotton crop.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2: 236-241. 1921. [Text in Chinese].—Soils, fertilizers, and planting methods are discussed.—*Chunjen C. Chen*.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 3291, 3325, 3344, 3435, 3520, 3524, 3553, 3593, 3651, 3652, 3666, 3680, 3719, 3723, 3731, 3732, 3764, 3767, 3876, 3946, 3951, 3963, 4199, 4240, 4253, 4352, 4366, 4396, 4437, 4543, 4547, 4567, 4592, 4602, 4613, 4619, 4683, 4704)

3386. ANONYMOUS. Additions to the library. Jour. Arnold Arboretum 3: 58-59. 1921 [1922].—An account of a copy of the 1st edition (1485) of the very rare Herbarius zu Teutsch is given. Another work recently added to the library is Collections de Cent Espèces ou Variétés du Genre Camellia Peintes d'après Nature . . . par Mlle. G. Fontaine, Bruxelles, 1845. This also is apparently very rare, as it is not mentioned in any of the bibliographies consulted.—*Alfred Rehder*.

3387. ANONYMOUS. Autobiography of the late Prof. John Macoun. Canadian Field Nat. 36: 39-40. 1922.—An autobiography of the late John Macoun will be published as a memorial volume by the Ottawa Field Naturalists' Club of Canada.—*W. H. Emig*.

3388. ANONYMOUS. Das Ende der deutschen höheren Forstlehranstalt in Mähr-Weiskirchen. [The end of the German forest school at Weisskirchen in Moravia.] Wiener Allg. Forst u. Jagd Zeitg. 39: 206. 1920.—Announcement is made of the closing of the forest school on July 11-14, 1921, on account of the impossibility of securing adequate financial aid. The school had been in existence for 69 years.—*F. S. Baker*.

3389. ANONYMOUS. Giacomo Giamician. Gazz. Chim. Ital. 52: 1-2. 1922.—The death of this investigator is announced.—*A. Bonazzi*.

3390. ANONYMOUS. The Crop Protection Institute—its organization and purpose. Crop Protection Digest Bull. 1. 9 p. 1921.—The history of the organization of this American

institute and the reasons for its existence are discussed. The constitution and by-laws are appended.—*F. D. Fromme.*

3391. ANDRES, H. *Verstorbene Botaniker des Vereinsgebietes.* [Deceased botanists of the Society district.] *Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens* 1919: D22-D24. 1920.—The following botanists, belonging to the district of the Botanical Society of Westphalia and the Rhine, are briefly commemorated: Paul Friedrich August Ascherson, Professor of Botany at Berlin, a systematic botanist of international reputation, was born in Berlin, June 4, 1834, and died there on March 6, 1913; Bodewig, Ph.D., primarily a geologist but interested also in botany and the author of a manuscript flora of the Rhine, was born at Bergheim, February 24, 1843, and died at Cologne, February 19, 1915; Gustav Jakob Herpell, a resident of St. Goar and for some time an apothecary there, a diligent student of fungi and bryophytes, was born at St. Goar, October 31, 1828, and died there July 22, 1912; Jacobs, a teacher at Brohl, interested primarily in geology but also in botany, was born at Peterswald, July 13, 1868, and died at Brohl, November 20, 1914; Leo Melsheimer, an apothecary at Wittlich but also a florist, died at Wittlich, June 25, 1915, at the age of 46; Franz Roth, a resident of Münster-eifel, interested in the local flora, died at Münster-eifel, June 11, 1914, at the age of 71; Eduard Strasburger, professor of botany at Bonn, one of the most eminent botanists of Germany, especially in the fields of cytology and morphology, was born at Warsaw, Poland, 1844, and died at Bonn, May 19, 1912. In the case of Ascherson and Strasburger references are given to published obituary notices.—*A. W. Evans.*

3392. BLIN, C. [Obituary.] *Bull. Géog. Bot.* 27: 1-6. 1919.—This letter announces the death of the permanent secretary of the Académie Internationale de Botanique, Hector Lévillé, but expresses a hope that the academy may continue and asks that subscriptions to the *Bulletin de Géographie Botanique* be sent to the writer.—*W. G. Waterman.*

3393. CALVINO, MARIO. *La estación botánica del central "Soledad" de Cienfuegos.* [The botanic station of the Soledad estate at Cienfuegos.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 542-544. 8 pl. 1921.—In 1901 E. F. Atkins established and provided for the maintenance of the Harvard Botanic Station for Tropical Research work and Sugar-cane Investigation. Harvard University placed the station under the direction of Mr. Oakes Ames, who placed Mr. Robert M. Grey in immediate supervision. A botanic garden was established containing aquatic and terrestrial exotic plants of economic and ornamental interest, some of the more interesting ones being: *Aleurites triloba*, a tree from whose seeds acid is extracted; *Coffea liberica*; *Eucalyptus citriodora*; *Sweitenia mahagoni* L., rare in Cuba and to be used in reforestation; *Nymphaea dentata*; and *N. stellata*.—A study was made of all varieties of foreign sugar canes noted for high sugar content to find those superior in Cuba to the variety Cristalina and to obtain seedlings and hybrids. Three series of experiments were inaugurated: (1) the selection of well-rooted plants with robust canes developing well on the shallow poorer soils, and their pollination with Cristalina, Calcedonia Queen, and varieties from Barbados; (2) the use of seed plants of Cristalina and the more prolific and high sugar yielding varieties from Barbados, Demerara and Java, and their pollination with pollen from the more vigorous Harvard "seedlings;" (3) the selection of the best cane producing and sugar yielding varieties. The work has continued more than 10 years with the following results: (1) A type of cane was obtained superior to Cristalina in yield of cane, producing as much or more sugar at high altitudes in the less fertile, gravelly soils, but in fertile soil producing less sugar; the yield in cane was always larger and the plants better rooted, longer-lived, and less subject to diseases. (2) Many varieties were obtained of value for commercial use which produced more cane than Cristalina but with inconstant sugar content, for during the dry cold weather the total amount of cane and sugar was superior but during favorable weather there was a gain in the amount of cane and a diminution in sugar content as compared with Cristalina. (3) Despite a tendency of reversion to primitive types, at least 12 varieties were selected from thousands of "seedlings" which proved superior to Cristalina. In all cases fertility of the flowers was better and a great quantity of good seed was produced.—*G. R. Hoerner.*

3394. CECIL, GEORGE. Mixed pharmacy in Malaya. Druggists Circ. 66: 219-220. 1922.—A description is given of the many queer practices among the pharmacists of the Federated Malay States.—C. M. Sterling.

3395. DACHNOWSKI, A. P. A question in national resources. The importance of a central station for peat and muck investigations. Sci. Amer. 126: 118. 1922.

3396. DENHAM, H. J. *Gossypium* in pre-Linnaean literature. Bot. Mem. [Oxford] 2. 24 p., 4 fig. 1919.—This is a comprehensive review of references in the works of 50 authors from Herodotus, about 521 B.C., to Linnaeus' *Systema Naturae* in 1767. Theophrastus' description was the first in botanical literature and Pliny first used the word *Gossypium*. No mention of cotton is noted between classical writers and post-Renaissance herbalists, though the plant was known around the Mediterranean during this time. The earlier herbalists included *Bombax* and *Eriodendron* in the term *Gossypium*, and "cotton" was used to include other textiles, especially woolen cloth. The earliest figures are described and those of Fuchs (1542) and Matthioli (1563), representing Levant cotton, *G. herbaceum*, cultivated in Crete, Malta, Sicily, and Italy and in gardens of France and Germany, are reproduced, as is the wood cut by Alpinus in his flora of Egypt (1592) representing *G. arboreum*. Ximenes published in Mexico (1615) the first description of a New World cotton. The Hortus Malabaricus of van Rheede figured *G. neglectum*. In 1706 Tournefort defined the genus and elaborately figured the floral mechanism. Confusion resulted from the very different treatment of the species in Linnaeus' *Species Plantarum* (1753) and *Systema Naturae* (1767-70), which is not simplified by an examination of the Linnaean Herbarium. If the classification by Linnaeus is to have any value, the earlier arrangement must be followed. The author believes that cotton evolved independently in India and in America. The antiquity of the genus is proved by the presence in Australia of an indigenous cotton, and by the differences between early American and Old World types. The geographical distribution of *Gossypium* has been greatly confused by cultivation and by the regression of "escaped" plants. A purely deductive use of general biological probabilities may throw much light on the production of varieties, mutants, and hybrids. The author promises in a subsequent paper to give the modern classifications and to discuss an arrangement of present day species and varieties.—Frederick L. Lepton.

3397. FABRICIUS. [Rev. of: MORSTATT, H., Compiler. Bibliographie der Pflanzenschutzliteratur. Das Jahr 1920. Biol. Anstalt Land- u. Forstw. Berlin-Dahlem. Paul Parey and Julius Springer: Berlin, 1921.] Forstwiss. Centralbl. 43: 475. 1921.—This is a new annual publication, citing the material published in the field of plant protection and diseases. It does not entirely fill the place of Hollrung's journal, which appeared from 1898 to 1913, which gave brief abstracts of the cited articles.—W. N. Sparhawk.

3398. GEISENHEYNER, LUDWIG. Einige Nachträge zu meiner Arbeit über die Physica der heiligen Hildegard. [Supplementary notes to my work on the Physica of St. Hildegard.] Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens. 1916: D15-D24. 1918.—An earlier study dealing with the Physica of St. Hildegard of Bingen, a work written in the 12th century but not printed until 1533, was published by the author in the 1911 volume of these transactions. In the present series of notes he discusses 4 plant names appearing in the Physica, interpreting them as follows: "Kurbesa," the bottle gourd, *Lagenaria vulgaris*; "Rifelhere," the whortleberry, *Vaccinium Myrtillus*; "Felbaum," the willow, *Salix alba*, and "Harbaum," a misprint for "Sarbaum," the poplar, *Populus alba*.—A. W. Evans.

3399. GEISENHEYNER, LUDWIG. Ew. H. Rübsaamen. Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens. 1919: D18-D22. 1920.—Rübsaamen was born at Hardt a. d. Sieg, Germany, May, 1857, and died at Berlin, March, 1919. Although primarily an entomologist, he was greatly interested in plant-galls and his most important scientific contribution was a richly illustrated work on this subject in 3 volumes, only 2 of which have

as yet been published. In the early part of his career he taught in various schools but later held scientific positions under the government.—A. W. Evans.

3400. GEROULD, J. H. Lamarck, Mirbel and the cell theory. *Science* 55: 421-422. 1922. The writer points out that the cell theory in broad outlines was taught in Paris 40 years before Schleiden and Schwann published their work.—C. J. Lyon.

3401. GRAMS, H. Die Kulturpflanzen und Unkräuter der Wikinger. [The cultivated plants and weeds of the Vikings.] [Rev. of: HOLMBOE, JENS. *Nytteplanter og ugræs i Osebergfundet*. [Useful plants and weeds in the Oseberg discovery.] *Osebergfundet* Vol. V. Kristiania, 1921.] *Naturwiss. Wochenschr.* 21: 81-85. 1922.—In 1903, the remains of a Viking ship of the middle of the 9th century was found at Oseberg, at the mouth of Kristiania fjord in Norway. The ship was the sepulcher of a queen, with her maid, horses, oxen, and dogs. One half a shell of walnut (*Juglans regia*) was found in the ship, also oats and wheat, as well as rye meal, and seeds of *Lepidium sativum typicum*, *Linum usitatissimum*, *Cannabis sativa*, and remains of pods of *Isatis tinctoria*. Of native plants, there were a large number of hazel nuts (*Corylus avellana*) and fruits of *Malus sylvestris*. Among the grain and cress seeds and between feathers in the burial chamber were found seeds of *Polygonum lapathifolium*?, *P. convolvulus*, *Chenopodium album*, *Urtica urens*, *Stellaria media*, *Capsella Bursa-pastoris*, *Lamium purpureum*, *Galeopsis tetrahit*, and *Cirsium orvense*. The remains of various other species were found about the vessel and in the stomach contents of the oxen and horses. Besides direct reference to the material discovered in the Viking ship, the reviewer mentions other sources of information concerning the food plants of the ancient inhabitants of northern Europe.—A. J. Peters.

3402. HOFFMAN, G. N. Irish healing skill hereditary. *Pharm. Era* 55: 175-176. 1922.—A brief review is given of some of the Celtic and Druidic practices and traditions running back many centuries, and of the potions, charms, and religion associated with the ancient beliefs.—C. M. Sterling.

3403. KOPELOFF, NICHOLAS, and LILLIAN KOPELOFF. The bacteriology and mycology of cane sugar deterioration. *Absts. Bact.* 6: 221-225. 1922.—A brief, historical review of the literature is given, with 54 bibliographical citations dealing with the inversion of cane sugar.—D. Reddick.

3404. LEE, H. ATHERTON, and COLIN G. WELLES. Phytopathological Society in the Philippines. *Phytopathology* 11: 516. 1921.—The Philippine Phytopathological Society was organized at a meeting in Manila, August 6, 1921, with a charter membership of 22.—B. B. Higgins.

3405. LORIA, GINO. [Rev. of: MIELI, A. *Gli scienziati italiani del Medio Evo ai nostri giorni*. [Italian scientists from the Middle Ages to our times.] Vol. I. 236 p. Attilio Nardocchia: Rome, 1921. *L.* 45.] *Scientia* 31: 307-308. 1922.

3406. MARTELLI, UGO LINO. Odoardo Beccari. *Webbia* 5: 295-343. 1921.—Odoardo Beccari was born at Florence, November 16, 1843. He entered the Ferdinando College of Lucca, where he came into contact with Ignazio Mezzetti, who awakened his interest in natural science. In 1861 he left to attend the University of Pisa, attained the post of assistant to the chair of botany, and remained until 1864 when he transferred to University of Bologna to complete his studies. After spending some time in London, Beccari sailed in 1865 for Borneo where he remained for 3 years making botanical and zoological collections. He returned to Florence, founded the *Nuovo Giornale Botanico Italiano*, and departed in 1871 for New Guinea, together with Luigi D'Albertis, after having made a 6-months' visit to Abyssinia. Beccari spent 4 years exploring the East Indies, returned to Florence, and, after another 2-years' voyage, touching Australia, Tasmania, etc., settled down to a life of study,

devoting his main efforts to the Palmae, and publishing voluminously. He died October 25, 1920.—*John M. Fogg, Jr.*

3407. MARVIN, F. S. *The science of ancient Greece.* [Rev. of: LIVINGSTONE, R. W., Editor. *The legacy of Greece.* xii + 424 p. Clarendon Press: Oxford, 1921.] *Nature* 109: 169. 1922.

3408. MORSTATT, H. *The Biologische Reichsanstalt at Berlin-Dahlem and the plant protection service in Germany.* *Phytopathology* 12: 23-24. 1922.—The work of the Biologische Reichsanstalt has been greatly enlarged by the addition of an economic section with special laboratories for the study of special crops. A new journal, *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, is being published.—*B. B. Higgins.*

3409. NORDMANN, V. *Oversigt over naturvidenskabelige Undersøgelser i Grønland* [Review of scientific investigations in Greenland.] *Nat. Verden* 5: 209-227. 7 fig. 1921.—In this short review of 200 years' investigation an account of botanical studies is included. About 340 spermatophytes, 30 pteridophytes, 600 bryophytes, more than 700 fungi, 300 lichens, and 200 algae are known.—*Ernst Gram.*

3410. QUISUMBING, FRANCISCO A. *Philippine contributions on agricultural, biological and industrial chemistry.* *Philippine Agric.* 10: 113-123. 1921.—A bibliography is presented of papers published in the Philippines during 14 years (1906-1920). Most of the work was done by the Bureau of Science and by the University of the Philippines. Many of the articles cited deal with soils and fertilizers, or with the chemistry of plant products.—*Sam F. Trelease.*

3411. RITTER, WILLIAM E. *Ellis L. Michael and his scientific work.* *Ecology* 2: 70-72. 1921.—A biographical sketch and appreciation is presented of the work of Ellis L. Michael, who was ecologist, author, and investigator at Scripps Institute, La Jolla, California, from 1905 to 1920.—*H. H. M. Bowman.*

3412. ROBERTS, W. *An Italian broadside, 1612.* *Gard. Chron.* 71: 130. *Pl. 93.* 1922.—The identity of a conventionalized figure of a plant called "Maranto," probably in honor of the Italian doctor and botanist, Bartolommeo Maranti, is discussed. It is of probable East or West Indian origin and the figure is published in the hope that some reader may recognize it.—*P. L. Ricker.*

3413. SHEAR, C. L. *Frederick Georg Emil Rostrup.* *Phytopathology* 12: 1-3. *Pl. 1.* 1922.—A brief sketch of the life and work of this Danish botanist is given.—*B. B. Higgins.*

3414. THOMSON, J. ARTHUR, Editor. *The outline of science, a plain story simply told.* Vols. I-IV. 1220 p., more than 800 illus., 40 in color. G. P. Putnam's Sons: New York and London, 1922.

3415. TILLERY, R. G. *The agricultural experiment station of Cuba.* *Louisiana Planter* 67: 235-237. 1921.—A history and description are given of the Agricultural Experiment Station of Cuba located at Santiago de las Vegas, with a discussion of the work in progress.—*C. W. Edgerton.*

3416. WINKLER, FR. *Aus der Entwicklungsgeschichte der Blumenzucht.* [The history of development of flower-growing.] *Gartenwelt* 25: 9-10. 1921.

3417. YULE, EMMA S. *Rice growing portrayed in Chinese art.* [Rev. of: RIEFSTAHL, MEYER R. *The pictures of plowing and weaving.* Asia, December, 1920, and January, 1921.] *Philippine Agric.* 10: 131-134. 1921.—The author reviews 2 articles on an old book, *Keng Chi-tu*, which appeared about 1145 A.D. and contains pictures, with descriptive commentaries, of Chinese methods of planting and plowing.—*Sam F. Trelease.*

3418. YULE, EMMA S. The Chinese Imperial spring plowing. *Philippine Agric.* 10: 407-409. 1922.—The Imperial spring plowing in the Temple of Agriculture, near Peking, originated about 2300 B.C. The festival was not really a religious ceremony, its object being to place and to hold tilling of the soil in China as the most honorable labor, the Sacred and Mighty Emperor himself not disdaining to hold the plow and turn the furrow. Today the Temple of Agriculture is a recreation park; splendid trees are preserved, and new ones of many varieties, as well as interesting and beautiful shrubs, are being planted.—*Sam F. Trelease.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 3343, 3344, 3818, 3890, 3892, 4077, 4167, 4279, 4595, 4603, 4713)

3419. ANONYMOUS. Definiciones con relación a la nomenclatura botánica. [Definitions with relation to botanical nomenclature.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 591-592. 1921.

3420. ANONYMOUS. Education in forestry. Proceedings of the second national conference, New Haven, Conn. December 17-18, 1920. U. S. Bur. Education Bull. 44. iii + 69 p. 1922.

3421. ANONYMOUS. Ex-Secretary Meredith on research. *Science* 53: 356-357. 1921.—This note consists chiefly of quotations from former U. S. Secretary of Agriculture Meredith's article in the *Country Gentleman* for Feb. 26, 1921.—*C. J. Lyon.*

3422. ANONYMOUS. [Rev. of: BECK, CONRAD. *The microscope.* 144 p., 181 fig. R. & J. Beck: London, 1921.] *Sci. Prog.* 17: 165-166. 1922.

3423. ANONYMOUS. [Rev. of: GIBERNE, AGNES. *The garden of earth.* xiv + 178 p., 47 illus. Society for Promoting Christian Knowledge: London.] *Sci. Prog.* 16: 490. 1922.

3424. ANONYMOUS. [Rev. of: SMITH, ANNIE L. *Lichens.* xxviii + 464 p., 185 fig. Cambridge University Press: 1921 (see Bot. Absts. 11, Entry 3459).] *Sci. Prog.* 16: 488-489. 1922.—[See also Bot. Absts. 11, Entries 2748, 2749.]

3425. ANONYMOUS. [Rev. of: WOOLSEY, T. S., with two chapters by GREELEY, W. B. *Studies in French forestry.* xxvi + 550 p., 21 fig. John Wiley & Sons: New York; Chapman and Hall: London, 1920.] *Sci. Prog.* 16: 487. 1922.—[See also Bot. Absts. 10, Entry 506.]

3426. ACHARIAR, K. RANGA, and C. TADULINGA MUDALIYAR. *A hand-book of some South Indian grasses.* 318 p., 228 fig. Government Press: Madras, 1921.—This is a manual designed to facilitate identification of the commoner grasses of the plains of South India. The scope of the book is indicated by the chapter titles: Introduction; The vegetative organs; Inflorescence and flower; Histology of the vegetative organs; Classification; and 5 chapters of detailed descriptions of about 100 species of grasses. There is a full page figure of each species.—*Winfield Dudgeon.*

3427. ATWOOD, WM. H. *Civic and economic biology.* xv + 470 p., 364 illus. P. Blakiston's Son & Co.: Philadelphia. 1922.—The book is written primarily for 2nd-year high school pupils. "Subject matter divided into seven units, which are given in the best order for a year's course, beginning in September." The 7 units are: How plants and animals live (45 pp.); The relation of life to food (plant nutrition, 52 pp., animal nutrition, 18 pp.); The

responses of plants and animals (44 pp.); Problems of growth and reproduction (98 pp.); Plant and animal breeding (problems which have been solved, 20 pp., problems which are being solved, 35 pp.); The doctrine of evolution (14 pp.); A few problems in civic and economic biology (99 pp.).—*C. S. Gager.*

3428. BADE, E. Artificial plants in the making. The study of osmosis under natural and artificial conditions. *Sci. Amer.* 126: 171. 5 fig. 1922.—Ways of producing Traube's cells by chemical means are described.—*Chas. H. Otis.*

3429. BEAUMONT, A. B. The field problem in the soils course. *Jour. Amer. Soc. Agron.* 14: 79-88. 1922.—Field exercises of the Massachusetts Agricultural College are given.—*F. M. Schertz.*

3430. BRADFORD, F. C. Problems in teaching freshmen pomology. *Proc. Amer. Soc. Hort. Sci.* 18: 241-245. 1921 [1922].—Previous to college the student has had a more or less closely disciplined training. In college he is thrown largely upon his own resources, and it is the teachers' problem to help him through this transitory stage. There is as great need for experienced teachers in this work as in the advanced courses, yet as a rule this work is assigned to the more or less inexperienced men. A discussion of what shall be taught and how is taken up.—*W. E. Whitehouse.*

3431. BROWN, PERCY EDGAR. The teaching of soil bacteriology. *Jour. Amer. Soc. Agron.* 13: 323-329. 1921.—The author discusses the problems and methods.—*F. M. Schertz.*

3432. CLUTE, W. N. Botany for beginners II. *Amer. Bot.* 28: 60-67. 1922.

3433. CLUTE, W. N. Plant names and their meanings XI. Leguminosae III. *Amer. Bot.* 28: 70-77. 1922.

3434. FEILITZEN, H. VON. Vad göres i de olika nordiska länderne för främjande av växtodlingen? [What is done in the different Scandinavian countries to promote plant culture?] *Nordisk Jordbruksforskning* 1921: 44-68. 8 fig. 1921.—Sweden has a central experiment station near Stockholm, founded 1907, and experimental fields are maintained at agricultural schools; but the work, although recently supported by donations, is insufficient and plans for extension are under preparation. Besides private institutions, colleges and associations contribute largely to the experimental work and to plant breeding. In 1920 Sweden had 52 plant culture consultants. Norway has had a state experiment field at the college at Aas since 1898, 6 local experiment farms, the experiment farm of the moor association, and the experiments of the weed-extermination consultant. Several associations and schools conduct local experiments. The local consultants have several tasks in addition to the promotion of plant culture.—Denmark has a much more intensive plant production. The state maintains 10 agricultural experiment farms, 3 horticultural stations, and special departments for weeds, phytopathology, and the testing of root crops. The associations are charged with all the local experiments (1920: 80 local plant production consultants and 2500 local experiments).—Finland has had an agricultural experiment station at Ånäs since 1907, connected with the university; local stations are planned. A plant breeding association and a moor association have experiment farms, and several of the farmers' associations maintain experiment farms while nearly all of them have farm bureau managers.—*Ernst Gram.*

3435. GAGER, C. STUART. Eleventh annual report of the Brooklyn Botanic Garden, 1921. *Brooklyn Bot. Gard. Rec.* 11: 25-91. 1922.—The report includes a brief account of investigations in plant pathology, ecology, and genetics carried on at the Botanic Garden during 1921. There is also given (Appendix 6) the "Agreement between the editorial board of *Genetics* and the Brooklyn Botanic Garden concerning the publication of the journal *Genetics*."—*C. S. Gager.*

3436. GRAVIS, A. De l'enseignement des sciences physiques et naturelles dans les établissements d'éducation moyenne. [On the instruction in physical and natural sciences in institutions of secondary education.] Arch. Inst. Bot. Univ. Liège 5: 20 p. 1914 [1920].—Considerations are presented on the subject of the organization of the course of secondary instruction in Belgium.—*Henri Michiels.*

3437. GRAVIS, A. L'enseignement normal des sciences. [Normal instruction in the sciences.] Arch. Inst. Bot. Univ. Liège 5: 30 p. 1914 [1920].—The address delivered at the opening session of the course at the University of Liege in 1912 is here published.—*Henri Michiels.*

3438. GRAVIS, A. Quelques réflexions au sujet de l'enseignement de la botanique. [Some considerations on the subject of instruction in botany.] Arch. Inst. Bot. Univ. Liège 5: 93 p., 2 pl. 1914 [1920].—A résumé of an elementary course in botany is presented, with considerations and advice on the subject of methodology.—*Henri Michiels.*

3439. HENNING, E. Växpatologiens ställning ved lantbruksundervisningen. [The position of phytopathology in agricultural instruction.] Nordisk Jordbruksforskning 1921: 321-327. 1921.—The courses in phytopathology at agricultural schools should be based on field trips, a notebook system, and simple field experiments. At the college microscopic determinations of fungi, pure culture methods, and control experiments should be added. The students should, when they leave college, remain phytopathological reporters and amateurs. As in Denmark, which for 40 years has had a special chair of phytopathology, it is highly desirable that in Sweden also this branch be segregated from botany.—*Ernst Gram.*

3440. HOLM, G. Fortbildungs und Schulfragen. [Training and school questions.] Gartenwelt 26: 138-141. 1922.—The author presents a general consideration of horticultural education in Germany, and an outline of lectures and practical courses being given for (1) training schools, (2) gardeners' schools, (3) horticultural schools, and (4) horticultural colleges.—*J. C. Th. Uphof.*

3441. HOLM, HERM. Schulgarten und Schulgärtner. [Schoolgardens and schoolgardeners.] Gartenwelt 25: 133-134, 141-142. 1921.

3442. HUTCHISON, C. B. The elementary course in genetics. Science 55: 416-421. 1922.—Genetics should be studied by both plant and animal illustrative material. The objective should be primarily cultural and secondarily informational (for an agricultural college, at least). The scope and contents of a course (16 weeks) at Cornell University is outlined.—*C. J. Lyon.*

3443. ILLING. Der botanische Garten in Berlin-Dahlem, ein Bildungsinstitut für junge Gärtner. [The botanical garden in Berlin-Dahlem, a training institution for young gardeners.] Gartenwelt 25: 24. 1921.

3444. ILLING. Ueber die Besetzung gärtnerischer Lehrämter. [Filling horticultural instructorships] Gartenwelt 24: 493-495. 1920.

3445. JANSON, A. Zur Hochschulefrage. [The college question.] Gartenwelt 24: 165-167. 1920.

3446. MACBRIDE, THOMAS H. The North American slime-moulds. New and rev. ed., xiii + 347 p., 23 pl. MacMillan Co.: New York, 1922.—In this edition the author corrects sundry typographical and other errata in the preceding edition; and also incorporates such new information in reference to individual species and to the entire subject as the researches of more recent years afford. "The present volume is intended especially for American readers

and is accordingly particularly devoted to a discussion of species so far reported on the western continent." A brief description of some other forms, and reference to many extra-limital species now generally recognized, are also included. As to nomenclature, the author says: "By general consent, of course, we strive to ascertain the oldest name on the list; the first that is really and clearly applicable, and we write all other names down as synonyms. In this volume a list of synonyms often accompanies the description; precedes it, showing, year by year, the history of the case; an abstract in fact of the title, as at last approved. The preparation of such an abstract . . . must be made, indeed, if we are ever in our discussions to be sure that when we speak or write in America, we are dealing with the same thing intended by the man who speaks or writes in England, or elsewhere."—C. S. Gager.

3447. McCALL, A. G. A uniform first course in soils for agricultural colleges. *Proc. Ann. Meetings Promotion Agric. Sci.* 40/41: 74-77. 1919/20 [1921].—A review is presented of recent discussions on teaching soils, and a report of a conference held in June, 1920, at the University of Kentucky, where representatives of 16 agricultural colleges met to consider this subject.—*Lyman Carrier*.

3448. McCLUNG, C. E. [Rev. of: SHARP, L. W. An introduction to cytology. 458 p., 159 illus. McGraw-Hill Book Co.: New York, 1921.] *Science* 55: 482-483. 1922.—[See also Bot. Abstrs. 11, Entry 230.]

3449. MANSFIELD, WILLIAM. Botany, developmental and descriptive. vii + 232 p., 135 fig. Lea & Febiger: Philadelphia and New York, 1922.—The first page of reading matter following page vii is number 17. The chapter headings of Part I, Developmental Botany, are (after the introduction, algae, fungi, liverworts, mosses, ferns, horsetails, gymnosperms, monocotyledonous angiosperms, dicotyledonous angiosperms. The chapter headings in Part II, Descriptive Botany, are: roots, stems, buds and leaves, inflorescence, flowers, fruits, seeds (including seed and fruit dispersal).—C. S. Gager.

3450. MATTOON, W. R. Botanic garden and arboretum for the Nation. *Amer. Forestry* 28: 8-11. 3 fig., 1 map. 1922.—A plan for the development of a great national arboretum and botanic garden at Washington, D. C., is briefly considered.—*Chas. H. Otis*.

3451. MENDIOLA, NEMESIO B. Instruction and investigation in plant breeding in the Philippines. *Philippine Agric.* 10: 105-107. 2 pl. 1921.—The author describes very briefly the nature of the work in teaching and research at the College of Agriculture, Los Baños, Philippine Islands.—*Sam F. Trelease*.

3452. MORRIS, ROBERT T. Nut growing. x + 296 p., 29 fig. Macmillan Co.: New York, 1921.—Part I (pp. 1-39) is entitled General Notes. Part II, Propagation, contains chapters on: 1. seeds, soils, transplanting; 2. grafting; 3. hybrids; 4. orchard care,—intercropping, pruning, parasites. Part III, Species and Varieties, contains 8 chapters on hickories, walnuts, hazels, chestnuts, pines, beech, oaks, almonds. The author states (p. 3) that "nut trees of many kinds are capable of furnishing all of the proteins, oils, and vitamins belonging to the meat group of foods," and that (pp. 21-22) "the twentieth century is to go on record for the sudden emergence of nut culture," favored by greater yield per acre of nut trees over ordinary field crops, and by increasing shortage of farm labor combined with comparatively slight amount of labor required to grow and harvest nut crops.—C. S. Gager.

3453. NORDMANN. Gärtnerische Winterschulen. [Horticultural winter schools.] *Gartenwelt* 25: 129-130. 1921.

3454. RANOACHANI, K. A manual of elementary botany for India. 2nd ed., xx + 572 p., 494 fig. Government Press: Madras, 1921. *Rupees* 4.—Intended originally for the students of the Agricultural College, Coimbatore, this book has been revised and extended to make it

suitable for intermediate college students throughout India. New material and illustrations have been scattered through the old chapters, and 14 entirely new chapters, on: the cell, tissues, nutrition, cryptogams, gymnosperms, evolution, heredity, Engler's system of classification, and reference books, have been added.—*Winfield Dudgeon*.

3455. ROSENTHAL, WILLY. Prüfungen im Gartenbau. [Examinations in horticulture.] *Gartenwelt* 25: 41-43. 1921.

3456. ROSENTHAL, WILLY. Titel im Gartenbau. [Titles in horticulture.] *Gartenwelt* 25: 13-14. 1921.

3457. SALISBURY, E. J. The study of human implements as an aid to the appreciation of principles of evolution and classification. *New Phytol.* 20: 179-184. 1921.—The progress of the development of man's implements offers a valuable analogy with respect to the general principles of evolution. The whole course of the evolution of implements may be followed from the crude efforts of prehistoric man to the modern tools. Such a series furnishes a concrete illustration of evolutionary progress of great pedagogical value. The implement inherits its form by tradition from one generation to the next, while each age impresses its environment upon it.—*I. F. Lewis*.

3458. SHUFELDT, R. W. Nature study in our public schools. *Amer. Forestry* 27: 717-724. Fig. 1-10. 1921.

3459. SMITH, ANNIE LORRAIN. Lichens. xxvii + 464 p., 135 fig. Cambridge University Press: 1921.—This volume is one of the series of Cambridge Botanical Handbooks, edited by A. C. Seward and A. G. Tansley. Publication was delayed owing to war conditions. The chapter headings are as follows: I. History of lichenology (previous to 1694, 1694-1867, and after); II. Constituents of the lichen thallus; III. Morphology; IV. Reproduction; V. Physiology; VI. Bionomics (growth and duration, season of fruit formation, dispersal and increase, erratic lichens, parasitism, diseases of lichens, harmful effect of lichens, gall-formation); VII. Phylogeny; VIII. Systematic. "Lichen development is the result of two organisms mutually affecting each other, but as the fungus provides the reproductive system, it is the dominant partner; the main lines of classification are necessarily determined by fruit characters. The algae occupy a subsidiary position, but they are also of importance in shaping the form and structure of the thallus. The different phyla are often determined by the presence of some particular alga; it is in the delimitation of families that the algal influence is of most effect." IX. Ecology; X. Economic and technical. The chapters are preceded by a glossary, errata, and an introduction. In the introduction the author refers to the prolonged controversy as to the true nature of lichens, particularly as to whether they are independent organisms or parasitic fungi, and says: "No theory of simple parasitism can explain the association of the two plants: if one of the symbionts is withdrawn—either fungus or alga—the lichen as such ceases to exist. Together they form a healthy unit capable of development and change: a basis for progress along new lines. Permanent characters have been formed which are transmitted just as in other units of organic life. . . . Lichens are plants of physiological symbiotic origin, and that aspect of their life-history has been steadily kept in view in this work." [See also *Bot. Absts.* 10, Entry 629; 11, Entries 2748, 2749, 3424, 4277].—*C. S. Gager*.

3460. VESTAL, A. G. A new profession. The recreation engineer and his part in making our vacations worth while. *Sci. Amer.* 125: 196, 207, 209. 4 fig. 1921.

3461. WOODHEAD, T. W. Junior botany. 210 p., 140 fig. Clarendon Press: Oxford, 1922.—This is an abridged and simplified edition of *The Study of Plants* by the same author, and is intended to serve as an introduction to the study of the life-work of common flowering plants, suitable for a junior course. The book is intended to be used only in connection with

the study of living material. Part I (11 chapters, 135 pages) considers The Vegetative Organs, taking the garden stock (*Matthiola* sp.) as a type-plant. Part II (6 chapters, 74 pages) is entitled The Reproductive Organs, including flower structure, pollination, seed-formation, structure of fruits, and dispersal of fruits and seeds.—C. S. Gager.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

(See in this issue Entries 3823, 3847, 3870, 4253, 4485, 4685, 4686, 4887)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEORGE D. FULLER, *Assistant Editor*

(See also in this issue Entries 3284, 3298, 3316, 3374, 3393, 3409, 3699, 3714, 3717, 3719, 3739, 3767, 3768, 3781, 3796, 3802, 3857, 3863, 3917, 3980, 4059, 4135, 4201, 4207, 4210, 4219, 4222, 4223, 4234, 4236, 4237, 4238, 4239, 4240, 4244, 4246, 4261, 4262, 4273, 4274, 4411, 4563, 4576, 4619, 4694, 4697, 4710, 4715, 4725, 4745, 4784, 4788, 4790, 4791, 4793, 4794, 4795, 4803, 4823, 4830, 4831, 4840, 4842, 4843, 4844, 4847, 4848, 4851, 4864, 4869, 4872, 4882, 4883, 4885)

FACTORS, MEASUREMENTS

3462. AMANN, J. Contribution à l'étude de l'edaphisme physicochimique. [Contribution to the study of physico-chemical edaphism.] Bull. Soc. Vaudoise Sci. Nat. 52: 363-381. 1919. —The author studied the relation of soil reaction to the growth of species of mosses. The reaction of the substratum was determined in all cases by the use of a new indicator, the "panchromatic indicator," consisting of a mixture of dimethyl-diaminotohephenazine chloride, tetraethyldiparaaminotriphenylcarbinol sulphate, and sodium diethylamino-benzenesulphonate, which served to show quite accurately the degree of acidity as well as alkalinity. It was found that an apparently uniform soil often shows great differences of a quantitative sort, and, not infrequently, even qualitative differences with respect to reaction. For example, the surface layers may be neutral, while the underlying layer is acid. Wind deposits, running water, and weathering may introduce differences between individual masses of soil. The different species were found to fall into 4 categories: (1) basiphiles, (2) oxyphiles, (3) neutrophiles, and (4) indifferent forms, in each of which are to be recognized obligate and facultative types. Among the facultative types may be distinguished those that thrive on neutral or acid substrata, the basineutrophiles, and those that thrive on neutral and acid soil, the oxyneutrophiles. Of the species determined with respect to soil reaction, 21 are listed as being oxyphilic, 22 as oxyneutrophilic, 35 as neutrophilic, 10 as basineutrophilic, 42 as basiphilic, and 14 as indifferent. The important influence of calcium in edaphic relations the author attributes largely to the ionization effected in the substratum. Moss associations, of a fairly definite kind, were found to be characteristic of soils of certain reactions. A special study of the genera *Pterigonium* and *Pottia* was made, and different species investigated relative to their adaptation to soil reaction.—Charles Drechsler.

3463. ARTHUR, J. M. Influence of environment on form and structure. [Rev. of: FOL-SOM, DONALD. The influence of certain environmental conditions, especially water supply, upon form and structure in *Ranunculus*. Physiol. Res. 2: 209-276. 24 fig. 1918 (see Bot. Absts. 1, Entry 1484; 2, Entries 307, 645).] Bot. Gaz. 69: 271. 1920.

3464. ATKINS, W. R. G. Relation of the hydrogen-ion concentration of the soil to plant distribution. Nature 108: 81. 1921.—The author quotes some results obtained in the British Isles during the past year. *Sedum acre* flourishes at pH 7-8 or over, and *S. anglicum* at pH 6.8-

51. Plants regarded by some as typical of limestone districts may be found elsewhere if the reaction is suitable. *Salvia verbenacea* flourishes at pH 7-8, *Crithmum maritimum* at about pH 8, *Cochlearia danica* and *Linoria cymbalorio* at pH 7.5-8, and *Centranthus ruber* at pH 7.4-8.8. *Ulex europaeus*, usually growing on acid soil, was found at pH 6.8-5.4 but some plants at 8.1-8.6. *Armeria maritima* occurs at pH 6.8 and 8.2, but typical sand-dune plants, —*Amphiphila arenaria*, *Euphorbia Porolias*, *Salsola Kali*,—only at about pH 8. Moorland plants, *Erica tetralix*, *Anagallis tenella*, *Drosera rotundifolia*, *Jasione montana*, etc. are found at pH 5.5-5.0.—O. A. Stevens.

3465. BUSCALIONI, L. Le precipitazioni in montagna ed i loro rapporti colla vegetazione. [Precipitation in mountain regions in relation to vegetation.] *Malpighia* 29: 205-230. Pl. 4, fig. 1-8. 1920.—Data are given by means of graphs on the precipitation in mountain regions, particularly in regard to the time of melting snow on high slopes, both those facing north and those with a southern exposure. Attention is called to the fact that in the dry localities the vegetation is composed chiefly of deciduous species, while a greater number of evergreens grow in the less arid situations.—Edith K. Cash.

3466. DARWIN, FRANCIS. Studies in phaenology, no. 2: 1920. *New Phytol.* 20: 30-88. 1921.—Continuing earlier studies, flowering dates for 272 species are given and the connection pointed out between the early flowering and the high spring temperatures in 1918 and 1920.—I. F. Lewis.

3467. FISHER, E. A. Relation of the hydrogen-ion concentration of the soil to plant distribution. *Nature* 108: 306. 1921.—The importance of this is rapidly becoming appreciated but there is a tendency to apply with little change methods which have been standardized, for other purposes. The colorimetric method of measurement should be given more attention. Fineness of division of the soil is a factor influencing the apparent value as determined colorimetrically and more data are needed from this standpoint. In some soils the actual value at time of determination may be of less value than the rate of change under natural conditions. Local variations in light soils are important.—O. A. Stevens.

3468. KING, CHARLOTTE M. Phenological notes for Iowa 1920. *Rept. Iowa State Hort. Soc.* 55: 117-123. 1920.—*Salix discolor* first bloomed at Poone on March 12; the soft maple at Ames on March 26, and on the same date at Boone and Lansing; *Corylus americana* on March 5. Temperature tables for Ames, Lansing, and Boone are given.—L. H. Pammel.

3469. OLSEN, CARSTEN. The ecology of *Urtica dioica*. *Jour. Ecol.* 9: 1-18. 1 pl. 1921.—The common nettle is abundant in Denmark, growing mostly in close communities. This gregarious habit is due to the activities of horizontal rhizomes which also account for the sharpness of the boundaries separating it from other vegetation. It thrives well in full light and in shade up to 5-10 per cent of open daylight, the greatest vigor being shown in 10-20 per cent of full illumination. A moderate amount of soil moisture also seems necessary to meet its requirements, but while Olsen has determined the percentage of soil moisture in the habitats under consideration, he has not attempted to determine the growth water available.—By several authors *Urtica dioica* has been placed among nitrogen requiring plants, and the principal feature of this investigation is the experimental examination of this quality. Microchemical tests showed that the plants themselves always contain a considerable amount of nitrates, especially in the stems, rhizomes, and roots. Soil samples were then taken, at a depth at which the roots of the plant abound, in 20 localities, some within and others without the nettle communities. The nitrate content of such samples was determined both at once when they were taken and again after the soil had been kept moistened in a jar at 18°C. for 25 days. This procedure was for the purpose of obtaining an expression of the nitrifying power of the soil. These data were tabulated together with the H ion concentration, the percentage of soil moisture, and the light value of the locality. An inspection of the resulting table makes it clearly evident that the only factor varying directly with the presence of

Urtica dioica is the nitrate content of the soil.—Experimental cultures of the plant were made using portions of rhizomes planted in washed sand and watered with nutrient solutions containing varying amounts of nitrates. Growth was in direct proportion to the relative amounts of available nitrogen, hence the conclusion was reached that *Urtica dioica* in nature is able to make sufficiently vigorous growth to enable it to compete successfully with other vegetation only where there is a relatively large amount of nitrogen in available form present in the soil.—The experiment also showed that nitrification proceeds in soils showing an acid reaction as high as pH 3.6, and that ammonium used as a source of nitrogen was toxic to the nettle.—Geo. D. Fuller.

3470. RAYNER, M. C. The ecology of *Calluna vulgaris*. II. The calcifuge habit. *Jour. Ecol.* 9: 60-74. 1 pl. 1921.—The earlier publication on this subject [*New Phytol.* 12: 59-76, 1913] established the facts that *Calluna vulgaris* occurs in small and sharply defined communities on the Wiltshire and Berkshire Downs and that there is associated with it an endophytic fungus growing in obligate association of such a nature that the *Calluna* in seedling condition is in complete dependence upon infection by the endophyte at a critical stage. In the present paper it is shown that, in nature, *Calluna* will not grow on calcareous soils, its development being so weak that it is soon eliminated by competition. There is an unknown inimical factor of chemical nature in the calcareous soils. This does not affect the endophyte when growing outside the plant but probably alters the infectibility of the root cells and their relations with the mycelium after infection.—Geo. D. Fuller.

3471. SNOW, LAETITIA M. Diaphragms of water plants. II. Effect of certain factors upon development of air chambers and diaphragms. *Bot. Gaz.* 69: 297-317. 5 fig. 1920.—The rate of growth of *Scirpus validus* is greater in water than in air, and greater at high than at low temperatures. Slowing of growth is accompanied by an increase in the diaphragm distance, since fewer diaphragms are formed. Lowered atmospheric pressure has no effect on the number or size of the air chambers in *Scirpus validus* or *Cyperus alternifolius*, and it is concluded that water with low oxygen content is not the direct cause of air spaces in aquatics or that the species studied are non-plastic.—H. C. Cowles.

3472. WEEVERS, TH. De plantengroei van het eiland Goeree in verband met zyn bodem en geschiedenis. [The flora of the island of Goeree in connection with its soil and history.] *Nederland. Kruidk. Arch.* 1920: 80-139. 1 map. 1921.—The author gives an enumeration of the plants of the island and treats in detail the marked difference between the calcifuge flora of the inland dunes and the calcicole plants of the sea dunes. The intricate problem of these calcifuge and calcicole plants is examined from different points of view and the great importance of the antagonism between the salts of univalent and bivalent metals in this problem is proved. Some observations are also reported about the transpiration of the halophytes in the saltmarshes.—Finally the difference between the flora of diluvial and alluvial soils in the Netherlands is dealt with, which difference is always marked, although the physical and chemical properties may be nearly the same.—Th. Weevers.

3473. WHERRY, EDGAR T. The soil reactions of *Spiranthes cernua* and its relatives *Rhodora* 23: 127-129. 1921.—The unusually wide range of *Spiranthes cernua* previously reported [see Bot. Absts. 10, Entry 967] as from specific acidity 300 to 3, with optimum at 30, was puzzling to the author until publication of Ames' recent article, Notes on New England Orchids.—I. *Spiranthes* [see Bot. Absts. 10, Entry 816], when it became apparent that the situation was due to the fact that *S. cernua* var. *ochroleuca* had not been distinguished from the typical form. In discussing the same paper the author protests against reducing *S. odorata* to varietal rank and puts forward evidence adduced from differences in habitat, soil reactions, habit, and morphology which he claims are sufficient to keep the 2 forms specifically separated.—James P. Poole.

STRUCTURE AND BEHAVIOR

3474. ANONYMOUS. Puncture plant protection. *Sci. Amer.* 125: 183. 2 fig. 1921.—This article describes the seed dissemination of *Tribulus terrestris*, a weed introduced and acclimated in sections of Arizona and California and which has recently been introduced into Kansas, Arkansas, Nebraska, Texas, Iowa, Indiana, and Illinois, largely through the automobile. —Chas. H. Otis.
3475. BIL, P. A. VAN DER. Additional host-plants of Loranthaceae occurring around Durban. *South African Jour. Sci.* 17: 185-186. 1921.
3476. BLAKE, J. E. H. Coiling of the underground shoots of *Convolvulus arvensis*. *Nature* 107: 747. 1 fig. 1921.—Aerial shoots are often found coiled before reaching the surface. No object was found enclosed in the coils. Similar cases are sometimes found in *Carduus arvensis*.—O. A. Stevens.
3477. CHRISTY, M. *Hieracium aurantiacum* L.: a case of protective colouration. *Jour. Botany* 59: 288-289. 1921.—Observations are reported on the golden-brown Fritillaries, butterflies showing marked preference for the rich orange-brown flowers of *Hieracium aurantiacum* in the Engadine.—S. H. Burnham.
3478. CUMMINS, H. A. Pollination in *Escallonia macrantha*. *Jour. Botany* 59: 111-112. 1921.—The author gives the results of observations made on insects instrumental in distributing pollen in *Escallonia macrantha*.—Adele Lewis Grant.
3479. FULLER, GEORGE D. Anatomy of prairie plants. [Rev. of: HAYDEN, ADA. (1) The ecologic foliar anatomy of some plants of a prairie province in central Iowa. *Amer. Jour. Bot.* 6: 69-85. 6 pl. 1919 (see Bot. Absts. 2, Entry 978; 4, Entry 227). (2) The ecologic subterranean anatomy of some plants of a prairie province in central Iowa. *Amer. Jour. Bot.* 6: 87-105. 14 pl. 1919 (see Bot. Absts. 2, Entry 745; 4, Entry 228).] *Bot. Gaz.* 69: 272. 1920.
3480. GODFREY, M. J. The fertilization of *Ophrys apifera*. *Jour. Botany* 59: 285-287. 1921.—This is a résumé of the "cause of a flower organized for cross-pollination by insects, which has been endowed with or acquired the faculty of self-fertilization, not in replacement of, but in addition to, its original capability of cross-pollination. . . . It is not retrogression but a step in advance."—S. H. Burnham.
3481. HEYWOOD, H. B. Bees and scarlet-runner beans. *Nature* 108: 147. 1921.—Flowers examined throughout the summer always showed the bases pierced by bumblebees. No pods formed during drought, but did so freely after rains began. In mid-September honeybees arriving before the bumblebees visited the flowers in the legitimate way.—O. A. Stevens.
3482. JONES, FRANK MORTON. Pitcher plants and their moths. *Nat. Hist.* 21: 296-316. 22 illus. 1921.—This paper lists, describes, and illustrates the 3 genera and 9 species of Sarraceniacae of America, the influence of insect-trapping plants on their insect associates, and the utilization of the pitchers as homes by certain nest-building Hymenoptera. The article describes the structure, habits, eggs, and larvae of the genus *Eryra*; also the pupae and moths.—Albert R. Sweetser.
3483. KING, C. M. Blooming dates of plants at Ames, Iowa, 1919, with duration of bloom. *Rept. Iowa State Hort. Soc.* 54: 98-104. 1919.—This is an annual record of the blooming of plants, mostly at Ames, Iowa, for the year 1919. The earliest dates recorded are: *Trillium nivale* March 28, dandelion April 1, white birch April 2, soft maple April 7.—L. H. Pammel.
3484. LOWE, H. J. Bees and scarlet-runner bean. *Nature* 107: 747. 1921.—The author adds to an earlier report [see Bot. Absts. 11, Entry 129] that while 1 species of bumblebee

visited the flowers in the normal way early in the season, later in the season a large species punctured the base of the flowers. The earlier flowers developed fruit, the later did not.—*O. A. Stevens.*

3485. MILLER, CHRISTY. The flowers of *Tragopogon*: their times of opening and shutting. *Jour. Botany* 59: 253-257. 1921.—Observations are reported on the flowers of *Tragopogon pratense* and *T. porrifolius*.—*S. H. Burnham.*

3486. REICHE, KARL. Die physiologische Bedeutung des anatomischen Baues der Crassulaceen. Mit einem Anhang: Zur Kenntnis von *Senecio praecox* DC. [The physiological significance of the anatomical structure of the Crassulaceae. Supplementary account of *Senecio praecox*.] *Flora* 114: 249-261. 4 fig. 1921.—The scattered arrangement of the vascular tissues is the chief anatomical character common to the members of the Crassulaceae. It is difficult to distinguish annual rings. This may be related to the absence of periodicity in the water-balance owing to the abundant water supply in the stem tissues. The author suggests that the succulents should be regarded as "inner water-plants," i.e., plants whose vascular strands are surrounded by tissues rich in water.—*Senecio praecox*, a common shrubby member of the xerophytic flora of central Mexico, is a root and stem succulent with thin broad leaves which are without hairs, scales, or varnish. The bundles are not scattered as in the Crassulaceae, but there are irregular projections into the pith and the phloem is penetrated by parenchyma. In this succulent, also, it is difficult to distinguish annual rings.—*A. G. Stokey.*

3487. ROCK, J. F. Nectar-feeding birds of Hawaii. *Jour. Heredity* 12: 281-284. 2 fig. 1921.—The Drepanidae of Hawaii include 35 species of birds belonging to 17 genera; the family is peculiar to Hawaii, and includes a large number of nectar-feeders which have developed characteristic long curved beaks. The latter are evidently specially adapted for obtaining nectar from tubular flowers; the most striking of the latter are the Hawaiian species of the tribe Lobelioideae, the flowers of which resemble to a remarkable degree the curved beaks of the Drepanid birds which feed upon them. The Lobelioideae belong to one of the oldest groups of plants inhabiting the archipelago, and the author looks to the ancestors of the present-day Drepanid birds, which show American relationship, as the possible agent of the dispersal of the baccate Lobelioideae. Evidence of the simultaneous development of the Drepanid birds and the Lobelioideae is seen in the fact that individual variation in the length of the bill is still found in Drepanid birds of today.—*P. G. Russell.*

3488. STEVENS, O. A. Further notes on evening flowers, panurgine and halictine bees. *Canadian Entomol.* 53: 65-69. 1921.—Further observations on *Gaura coccinea* show that its flowers open mostly during the 2 hours before sunset. Lists of flowers visited by *Agapostemon* and other bees (45 species are recorded for *A. texanus*) are given.—*O. A. Stevens.*

3489. THODAY, D. On the behaviour during drought of leaves of two Cape species of Passerina, with some notes on their anatomy. *Ann. Botany* 35: 585-602. 13 fig. 1921.—The structure and behavior of leaves of *Passerina filiformis* and *P. folcifolia* are described. On the upper side of the leaves are woolly grooves which become completely closed as the water-content falls at the end of the dry season. The water-content of shoots with closed leaf-grooves ranges from 25.7 to 34 per cent, while that of shoots with new growth at the end of the rainy season is about 60 per cent. Closure is attributed to cohesive forces in the outer epidermis. The deep cells of this layer have a very thick cuticle and as they contract, their lateral walls are thrown into bellows-like folds. The palisade cells may also show fine bellows-like folding. Water storage is regarded as at most a subsidiary function.—In *P. filiformis* the fibers interrupt the palisade tissue outside the bundles and spread laterally under the epidermis. In surface view the hypodermal fibers are seen wandering between the bundles, taking an irregular course and growing apically. The juvenile leaves of both species are slightly concave but not grooved and are glabrous with a waxy bloom. The stomata are not

raised as in the adult, but sunken. The cotyledons are convex above and have a palisade tissue on the upper side, not on the lower side as in the juvenile and adult leaves.—W. P. Thompson.

VEGETATION

3490. ARRHENIUS, OLOF. Species and area. Jour. Ecol. 9: 95-99. 1921.—A formula is given for finding the relative richness or poorness in species of a floral district. This is shown to hold within wide limits and shows that the species of an association are distributed according to the laws of probability, and that their number increases continuously as the area increases. He therefore regards the characterization of associations by "constants," that is by species which are always found in it, to be misleading since every species belonging to an association may become a "constant" if the plots considered be made large enough. Thus the usefulness. Arrhenius regards associations as passing into each other quite continuously.—Geo. D. Fuller.

3491. BAUDIN, LOUIS. Contribution à l'étude de la répartition verticale du plancton dans le Léman. [The vertical distribution of plankton in Lake Lemman.] Bull. Soc. Vaudoise Sci. Nat. 52: 275-316. 1919.—The author investigated the seasonal variation in depth of different forms of plankton. It was found that the most favorable time to study vertical distribution of a species is when it is at or near its maximum abundance. For *Synedra* this occurs in June, being then very plentiful at the surface, and fairly abundant beyond a depth of 10 m. *Asterionella* becomes quite abundant at 10 m. depth in October, reaching its maximum development in January, when it occurs in almost equal abundance at depths of 1 m. and 25 m.; its seasonal decline is gradual, considerable numbers still occurring at a 25-m. depth in June. *Fragilaria* behaves somewhat similarly, except that after attaining its maximum in January its decline is much more abrupt. Among the Flagellates, *Dinobryon* and *Ceratium* show maximum development in waters of moderate temperature, their maximum being attained in spring,—in early May in the case of *Dinobryon*, and in June in the case of *Ceratium*. After partial cooling of the water in fall, the 2 genera often show a secondary maximum.—Charles Drechsler.

3492. BIRGE, E. A., and C. JUDAY. Further limnological observations on the Finger Lakes of New York. Bull. U. S. Bur. Fish. 37: 209-252. 1921.—The occurrence and relative abundance of the phytoplankton, chiefly a few myxophyceae and the diatoms *Asterionella* and *Fragilaria*, are reported.—T. C. Frye.

3493. COWLES, H. C. Ecology of tide lands. [Rev. of: OLIVER, F. W., in CAREY, ALFRED E., and F. W. OLIVER. Tidal lands: a study of shore problems. 277 p., 29 pl., 54 fig. Blackie & Son, Ltd.: London, 1918 (see Bot. Absts. 3, Entry 1972).] Bot. Gaz. 69: 350-351. 1920.

3494. DELF, ELLEN MAHON. Marine algae of the Cape Peninsula. South African Jour. Nat. Hist. 3: 53-64. Fig. 1-4. 1921.—In late years efforts have been made to trace the life history of seaweeds, but very little of this work has been done in South Africa. The green, brown, and red pigments have a real significance in the life of the plant; all undergo decomposition in bright sunlight, the red and brown being the more sensitive. In a pool near Camps Bay was a plant of *Gelidium cartilagineum*, well grown and just submerged; in this pool the light intensity was not more than $\frac{1}{10}$ full daylight. Another deep-water red alga, *Placomium coralloides*, common on rock faces in False Bay, has been found growing at a depth of 36 feet. Other factors besides light intensity determine distribution. One of these is the power of resistance to desiccation when the tide recedes; this often leads to a more or less definite zonation. In shallow rock pools *Ulva* spp. and *Enteromorpha* sp. are common; *Codium tomentosum*, *C. Lindenbergi*, and *Caulerpa ligulata* are found only in deep pools; several species of *Cladophora* are found in mid-tide pools, for example, *C. flagelliformis*, *C. hospita*, and *C.*

Ecklonia. In deeper water *Ecklonia buccinalis* and *Macrocystis pirifera* are found. A large number of other species occurring in the Cape Peninsula are enumerated and their habitat described.—E. M. Doidge.

3495. ENDRISS, W. Das Pflanzenleben der Bithynischen Halbinsel. [The plant life of the Bithynian peninsula.] Beih. Bot. Centralbl. II Abt. 38: 399-409. Pl. 2. 1921.—The plate is a geological map showing the kind and age of rock in the area. As a western extension of the highlands the peninsula is naturally a forest area for the most part. But today the coastal areas (Riviera) are not forested. The various types of vegetation are mentioned with lists of the typical plants in the different regions; the cultivated plants are included.—L. Pace.

3496. FULLER, GEORGE D. Ecology of fungi. [Rev. of: DUFRENOY, J. Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological conditions in the development of parasitic fungi.—A study in plant geography.] Bull. Trimest. Soc. Mycol. France 34: 8-26. 1918 (see Bot. Absts. 2, Entry 900).] Bot. Gaz. 69: 359. 1920.

3497. FULLER, GEORGE D. Alpine vegetation of the central Andes. [Rev. of: HAUMAN, LUCIEN. La végétation des hautes Cordillères de Mendoza (République Argentine). [The vegetation of the high Cordilleras of Mendoza.] An. Soc. Cien. Argentina 86: 121-188. 18 pl., 7 fig. 1918 (see Bot. Absts. 8, Entry 953).] Bot. Gaz. 69: 354-356. 1920.

3498. FULLER, GEORGE D. Sedge associations in Colorado. [Rev. of: RAMALEY, FRANCIS. The role of sedges in some Colorado plant communities. Amer. Jour. Bot. 6: 120-130. 2 fig. 1919 (see Bot. Absts. 3, Entry 1974).] Bot. Gaz. 69: 360. 1920.

3499. FULLER, GEORGE D. Colorado grasslands. [Rev. of: RAMALEY, FRANCIS. Xerophytic grasslands at different altitudes in Colorado. Bull. Torrey Bot. Club 46: 37-52. 2 fig. 1919 (see Bot. Absts. 3, Entry 1975).] Bot. Gaz. 69: 358-359. 1920.

3500. GOOR, A. C. J. VAN. Die Zostera-Assoziation des holländischen Wattenmeeres [The *Zostera* association of the Dutch Wattensee.] Recueil Trav. Bot. Néerland. 18: 103-121. 1921.—The surface of the *Zostera* meadows between the coasts of North Holland and Friesland, and the North Sea islands, Texel, Vlieland, and Terschelling, amount to about 15,000 hectares. The meadows of *Zostera marina* are to be found under the low water surface. In very clear water they have been observed at a depth of 11 m., in a few instances at 14 m. Near Riepel *Zostera* grows in 33 per cent and south of Wieringen in 20 per cent seawater. It has been found in as low as 10 per cent seawater in the company of *Potamogeton pectinatus* L. and *Zannichellia pedicellata* L. Further south of Zuiderzee it grows but little. The geographical distribution is further given of *Z. marina* var. *stenophylla* A. & G. and *Z. marina* var. *angustifolia* Horn. In the *Zostera* fields the following Florideae were found: *Polydora nigrescens* (Dillw.) Grev., *P. violacea* (Roth.) Grev., *Gracilaria confervoides* (L.) Grev., *Ceramium rubrum* (Huds.) Ag., and some other species, whereas *Melobesia Lejolinii* Rosan forms small irregular whitish spots on old leaves. The Phacophyceae are represented by but few species, especially *Ectocarpus siliculosus* (Dillw.) Lyngb., *E. confervoides* (Roth.) Le Jolis, and sometimes *E. rufulus* Kütz. Of the Chlorophyceae, species of *Cladophora* predominate.—J. C. Th. Uphof.

3501. HASTINGS, G. T. The forest flora of Grassy Sprain Ridge. Torrey 21: 73-76. 1921.—A study was made of the plants on the top and upper slope of Grassy Sprain Ridge, Westchester County, New York, to determine (1) whether a new type of forest flora was developing, (2) whether any correlation existed between the herbaceous vegetation and particular species of trees. The quadrat method was followed; 41 species of trees were listed, a total of 1857 trees being counted, 37 per cent of which were oaks. *Quercus velutina* was the dominant species. The new forest will differ from the old chiefly in the loss of the chest-

nut, walnut, and hemlock, and in the addition of sour cherry, hackberry, and ailanthus. Hickory, white and black oak, black birch, and sugar maple will persist. The ash will become relatively more important. The locust, sumach, aspens, and gray birch will ultimately give way. No definite correlation was made out between the herbaceous vegetation and the trees.—J. C. Nelson.

3502. HENDMAN, W. A. An intensive study of the marine plankton around the south end of the Isle of Man.—Part XI. Proc. and Trans. Liverpool Biol. Soc. 33: 95-105. 1919.—The author gives the results of observations over a series of years on seasonal abundance of marine plankton in the Irish Sea. Diatoms were found most abundant in May when the sea was nearly at its lowest temperature, and attained their minimum in August, the warmest month of the year. By far the greater part of the population of the diatom flora is represented by a few important genera, *Biddulphia*, *Coscinodiscus*, *Chaetoceras*, *Rhizosolenia*, *Phalassiosira*, *Gyrodinium*, and *Lauderia*, of which *Chaetoceras* and *Rhizosolenia* are most abundant, the former being the most preponderant in March, April, and May, the latter in May and June. Among the Dinoflagellata, *Ceratium tripos* is the most abundant, outnumbering all the species of *Peridinium* several times. The maximum for the Dinoflagellata occurs in July; the minimum in September, with a secondary maximum in October, followed by a regular decline by the end of the year.—Charles Drechsler.

3503. HERDMAN, W. A., ANDREW SCOTT, and MABEL H. LEWIS. An intensive study of the marine plankton around the south end of the Isle of Man.—Part XII. Proc. and Trans. Liverpool Biol. Soc. 34: 176-184. 1920.—The plankton maximum was again found to come in May, the minimum in December. The diatoms taken by themselves form the usual double crested curve with a greater maximum in May, a minimum in August, and a 2nd lower maximum in November. The author notes a fair degree of correlation between periods of greatest abundance of phytoplankton and the spawning of most marine fish. In cases where the development of plankton occurs later than the spawning season, there would seem to be some risk that the larvae find no phytoplankton food, or very little.—Charles Drechsler.

3504. JEPSON, WILLIS L. The fire-type forest of the Sierra Nevada. Intercol. Forest. Club Ann. 1: 7-10. 1921.—The author describes the chief species of trees with observations on the influence of fires on the distribution of each.—Woodbridge Metcalf.

3505. KERNHOLTZ-LORDAT, G. Phytogéographie génétique des dunes du golfe du Lyon. [On the genetic plant geography of the dunes of the Gulf of Lyons.] Compt. Rend. Acad. Sci. Paris 173: 728-730. 1921.—It is found that an association called an *Agropyretum*, characterized by *Agropyrum junceum*, precedes the association termed *Ammophiletum*, characterized by *Ammophila arenaria*. This latter association is followed by the *Crucianelletum*, which has as its principal representative *Crucianella maritima*.—C. H. Farr.

3506. MAYNE, CATHERINE. Report of the Edward Forbes Expedition. Proc. and Trans. Liverpool Biol. Soc. 33: 31-35. 1919.—Data were collected on the possible density of population of *Fucus* and *Laminaria*. *Fucus* was found growing at the level of half tide in great masses on the tops of rocks, attaining a length of 18 inches. Thirty-five stalks of *Fucus serratus* per square foot was found to represent a typical condition. *Fucus vesiculosus* showed, in 1 instance, 352 stalks arising from 12 bases. *Laminaria* begins to appear at the level of the lowest spring tides, increasing in density with the depth, from 6 to 8 stalks mingled with *Fucus* to 86 stalks 2 feet further down.—Charles Drechsler.

3507. NAUMANN, EINAR. Über einige besonders auffallende Hochproduktionen aus Nanoplankton im Süßwasser. [On some particularly striking cases of high production of nanoplankton in fresh water.] Ber. Deutsch. Bot. Ges. 37: 40-50. Fig. 1-7. 1919.—The author reports the following cases of unusually abundant production of plankton organisms in fresh water: *Ankistrodesmus falcatus* var. *spirilliformis*, 10,000,000 per cc.; *Dactylococcus*

infusorium, 8,000,000 per cc.; and an undetermined green alga, 40,000,000 per cc. In each of these cases the organisms were growing in very small bodies of water containing large amounts of organic matter in solution. Although these numbers of organisms per cc. are far in excess of the greatest number previously reported, it is not believed that such cases of high production are rare. The usefulness of the haemocytometer in counting such great numbers is pointed out.—R. M. Holman.

3508. OLSEN, CARSTEN. Mosvegetationen. [Moss vegetation.] Part V of: PETERSEN, HENNING. Maglemose i Grih Skov. Undersøgelser over Vegetationen paa en nordsjællandsk Mose. Bot. Tidsskr. 37: 23-47. 1920.—In the study of this particular high moor, *Sphagnum* is the characteristic plant. The different varieties in order of their frequency are: *Sphagnum angustifolium* C. Jens, *S. rubellum* Wils., *S. apiculatum* H. Lindb., *S. magellanicum* Brid., *S. acutifolium* Ehrh., *S. palustre*, *S. cuspidatum* Ehrh., *S. imbricatum* Hornsch, *S. fuscum* (Schimp.) Klinggr., *S. fimbriatum* Wils., *S. Russowii*. Warnst. To determine the extent of distribution of each, Raunkiaer's statistical method was used.—There is considerable variation in the relation of the different varieties to the moisture factor. *S. cuspidatum* grows when completely submerged or partially so, while *S. acutifolium* is found above the water level. For each species there is a specific level. On the basis of the medium water level for 1914, *S. cuspidatum* was found 27 cm. below and 10 cm. above; *S. recurvum*, 3 cm. below to 39 cm. above; *S. magellanicum*, 14-53 cm. above; *S. imbricatum*, 14-63 cm. above; *S. acutifolium*, 20-80 cm. above. Naturally the submerged varieties do not form cushions, but such varieties as *S. magellanicum* and *S. palustre* have well marked cushion growths. *S. imbricatum* and *S. rubellum* are even more conspicuous in that the mound-like growths topple over and give a foothold for other varieties. In this respect *S. acutifolium* is the most outstanding, being in 1 case 60 cm. above the surface and 2 m. in diameter. In among these cushion-like growths are a large number of pore spaces.—In this high-moor are other species of mosses such as *Hylocomium Schreberi*, *H. splendens*, and *Hypnum cupressiforme*. The largest number of these mosses is found in the northern part where the habitat is drier. Usually they are found growing under the heath. *Hypnum cupressiforme* is often seen as an epiphyte upon birch logs. *Hylocomium* is rather evenly distributed over the entire moor. Here and there in the northern portion are found small mounds of *Leucobryum glaucum*, which extends far up into the birch woods. *Polytrichum commune* grows abundantly along the edge upon the comparatively high areas, free from heath. Under the large birch trees are found *Webera nutans*, *Georgia pellucida*, *Aulacomnium androgynum*, and *Jungermannia ventricosa*.—A. L. Bakke.

3509. PEARSALL, W. H. The development of vegetation in the English lakes, considered in relation to the general evolution of glacial lakes and rock basins. Proc. Roy. Soc. London B. 92: 259-284. 1921.—These rock basin lakes of glacial origin can be arranged in a series indicating respective degrees of development. The principal criterion is erosion within given drainage basins and resultant silting of lakes. As contrasted with the primitive lakes the evolved ones show (1) higher percentage of drainage system cultivable, (2) smaller percentage of rocky shore above 9 m. depth, (3) less *Isoetes*, *Nitella*, and *Juncus fluitans*, (4) more *Potamogeton* and *Najas*, (5) diatoms instead of desmids, (6) perch and pike instead of trout, (7) rapid decay of organic remains. Evidence is presented connecting biological differences with physico-chemical conditions which can be traced to physiographic change.—Paul B. Sears.

3510. SALISBURY, E. J., and A. G. TANSLEY. The Durmast oak-woods (*Querceta sessiliflorae*) of the Silurian and Malvernian strata near Malvern. Jour. Ecol. 9: 19-38. Pl. 1. 1921.—This study shows both by chemical analyses and by an examination of the vegetation that the assumption that calcareous rocks give rise to calcareous soils is often an erroneous one. *Quercus sessiliflora* is usually found on siliceous soil and yet in the areas under consideration it occurs over calcareous surface strata. Careful examination, accompanied by analyses, shows that leaching greatly reduces the calcium content of the surface soils, at times even to the extent of producing soil that requires the application of lime to give any fair amount

of agricultural fertility. There are also indications that the original succession may have included a pioneer forest of *Frazinus*, a calcicole, followed by the more siliceous forest dominated by *Q. sessiliflora*. It is also shown that the common practice of coppicing tends to decrease the acidity of the substratum.—Geo. D. Fuller.

3511. SAMPSON, HOMER C. An ecological survey of the prairie vegetation of Illinois. Bull. Illinois Nat. Hist. Surv. 13: 523-577. Pl. 43-77. 1921.—The purpose of the survey was to determine "the composition and ecological relation of the prairie vegetation of Illinois." "The importance of temperature and the ratio of rainfall to evaporation in determining the boundaries of prairie vegetation is emphasized. Climate alone is not the determining factor in the occurrence of prairie vegetation. Edaphic factors and the difficulty of forest vegetation establishing itself must be taken into account." Climatic factors are important in determining the general boundaries of distribution of the prairie while edaphic factors are important in determining the origin and character of the prairie associations within these boundaries. The location of the existing virgin prairies of the state is given. Railroad rights-of-way, old line-fences, and roadways were important in revealing undisturbed prairie vegetation in many sections in the upland prairie regions where cultivation had eliminated virgin tracts. The origin of the prairie habitats in relation to the geological history of the state is presented. Following glaciation the moraines in general became forested while the post-glacial lakes and swamps, slowly drained, became prairies. Post-glacial drainage followed by erosion gave forest vegetation a chance to establish itself along the principal water courses. Outwash from the Wisconsin glaciers gave rise to enormous sand areas and sand dunes in the northern half of the state. "There is some evidence that the sand prairies and some of the upland prairie region of the state date back to an arid post-glacial period during which there was an eastward extension of the prairie and plains flora. The conifer zone following the retreat of the glacier is thought to have been succeeded immediately by a xerophytic prairie flora extending as far eastward as Ohio. Subsequent increase in humidity in the Mississippi valley was then followed by a western migration of a more mesophytic prairie flora." Two distinct groups of associations resulted: the hydrarch successions found on flood plains, in morainal depressions, and on the old lake bed of Lake Chicago; and the xerarch successions found on sand and xerophytic upland glacial soils. A detailed account of the above successions is given. In the hydrarch successions, that of the river flood plains is represented by the flood-plain of the Mississippi River, south of Savanna. Diagrammatic representations of the associations together with numerous plates are presented to illustrate the successions here and on other rivers. The hydrarch succession on the old lake bed of Lake Chicago is similarly treated. A summary of the hydrarch succession in the morainal depressions shows the same relation of species as on the river flood plains. From swamp to prairie the species are *Scirpus fluvialis*, *Carex vesicaria* (and other *Carex* species), *Spartina Michauxiana*, *Calamagrostis canadensis*, *Panicum virgatum*, and *Andropogon furcatus*. The effect on these successions brought about by grazing and cultivation is also represented in some of the diagrams. In the xerarch succession on upland glacial soils it was found that the *Andropogon furcatus* association always terminated the hydrarch successions. *Andropogon furcatus* is regarded as the climax grass of the whole upland prairie region and in the successions leading to this climax from the more xerophytic uplands and exposed clay soils *Andropogon scoparius* is the most important species. The forests working back from the water courses gradually invaded these upland prairie soils. The xerarch succession on sand is not treated in as much detail as the other succession on account of the previous work of Gleason on this subject. A detailed account of the species represented in the various associations is presented. A discussion of the relation of prairie and forest is included. Methods of the invasion of the forests on the prairie region are noted. A very full annotated list of species, grouped in families, indicating the associations in which they occur, is given in tabular form. A non-technical summary for the general public is presented. A bibliography is appended.—H. W. Anderson.

3512. THOMAS, H. HAMSHAW. Some observations on plants in the Libyan desert. *Jour. Ecol.* 9: 75-89. 1 pl., 1 fig. 1921.—This is a report of observations made from a military camp near Warden, 40 km. northwest of Cairo. Here the average annual rainfall is about 25 mm., almost all coming during the first 4 months of the year. The temperature is usually high with a recorded maximum of 115°F. within a tent during a sandstorm in April. The gravelly desert is one of the most barren spots in the world. Only 8 species are listed, 2 of which are termed frequent and are seen near the close of the rainy period in March and April. They are a bulbous liliaceous plant, *Dipcadi erythraeum*, and a geraniaceous plant of rosette habit, *Monsonia nivea*. Both are ephemeral, the aerial portions enduring for a few days only. A small lichen upon a pebble is recorded. After the moist period it was possible to travel for miles without seeing a single plant. Upon the sand-covered alluvium and upon the transition from the gravelly desert, the vegetation was slightly more abundant and included 2 or 3 grasses and shrubby plants such as *Convolvulus lanatus*, *Calligonum comosum*, *Tamarix nan-nifera*, and *Heliotropium luteum*. Some notes on the destructive effects of sandstorms are recorded and a few root systems are described. The well developed taproot predominates.—*Geo. D. Fuller.*

3513. THOMPSON, W. P. A botanical trip through German South-West Africa. *Canadian Field Nat.* 35: 74-75. 1921.—The few xerophytic plants found in the desert regions where *Tumboa mirabilis* grows are briefly described together with notes on their habits and habitats.—*W. H. Emig.*

3514. UPHOF, J. C. TH. Die Waldflora im Staate Washington. [The forest flora of the state of Washington.] Vegetationsbilder 13: 1-5. Pl. 37-42. 1920.—A short description is given of the climate and geology of Washington. There is a table of the principal forest trees containing the diameter and length of the stem and the highest age attained, which is followed by a table of the acreage of the national forests of Washington. The forest trees are divided over (1) Upper Sonoran Area, (2) Transition Area, (3) Arid Transition Area (4) Canadian Zone, (5) Hudsonian Zone, whereas the Arctic Area is left out of consideration, being deprived of forests. The plates contain a forest of *Thuja plicata* in the Olympic Mountains, a forest of *Larix occidentalis* in the Cascade Mountains, a mixed forest near Mount Rainier, a mixed forest in the Cascade Mountains, a forest of *Pinus ponderosa* near the Columbia River, and a mixed forest in the Cascade Mountains.—*J. C. Th. Uphof.*

3515. UPHOF, J. C. TH. Vegetationsbilder aus dem Staate Michigan. [Vegetation views from the state of Michigan.] Vegetationsbilder 13: 1-5. Pl. 43-48. 1921.—At first a general account of the climate and geology is given which is followed by a short description of the flora in the principal parts of Michigan. The plates contain: a mixed forest in southern Michigan; a mixed forest near Lansing; a young forest near Mason; a forest of *Pinus Strobus* near Lake Higgins; *Pinus resinosa* near Lake Michigan; *Tsuga canadensis* near Lake Huron; *Sarracenia purpurea* near Lansing; sand dunes along Lake Michigan.—*J. C. Th. Uphof.*

3516. WHINSTEDT, K. Om Vegetationen paa Sejro. [The vegetation of Sejro.] *Bot. Tidskr.* 37: 83-106. 1920.—This island, first visited by S. A. Steinbeger in 1843, has a flora of about 400 species from which many species found in other parts of Denmark are absent. It consists of 2 distinct parts, drift and alluvium, the former having the older flora, that on the alluvium being introduced by the aid of wind, water, animals, and man. Forest is absent with the exception of a grove of planted conifers near Mastrup. The vegetation of the hills, bluffs, strand, bogs, and ponds is described and lists of species given.—*A. L. Bakke.*

FLORISTICS

3517. ANONYMOUS. A possible ancient migration of useful plants westward in Asia. *Gardens' Bull. Straits Settlements* 2: 444. 1921.—After referring to conclusions arrived at with regard to migration by water westward in Asia, the suggestion is made that one of the waves reaching Ceylon and South India from Malaya might have carried the coconut with it.—*I. H. Burkill.*

3518. ANONYMOUS. Additions to the wild fauna and flora of the Royal Botanic Gardens, Kew: XV. Kew Bull. 1920: 212-217. 1920.

3519. ANONYMOUS. The origin of the coco-nut palm. Agric. News [Barbados] 20: 209-211. 1921.—The divergent views of O. F. Cook and O. Beccari are discussed; the former considers America the palm's original home, the latter, Asia.—*J. S. Dash.*

3520. ALMQUIST, ERIK. Västgeografiska bidrag. 2. Norrbotten. [Phytogeographic contributions. 2. Norrbotten (northernmost province of Sweden).] Bot. Notiser 1920: 127-133. 1920.—A list of 116 species with localities and notes is given. As an appendix there is a list of 33 adventive species found at Karungi in 1915. Karungi was the terminal of the Swedish northern trunkline railroad, and over it went the enormous transit traffic to Finland and hence to Russia during the first part of the World War.—*P. A. Rydberg.*

3521. ALMQUIST, ERIK. Västgeografiska bidrag. 3. Jämtland. [Phytogeographic contributions. 3. Jämtland (a province in northern Sweden).] Bot. Notiser 1920: 213-214. 1920.—New localities for 35 of the rarer plants are given.—*P. A. Rydberg.*

3522. ANDERSON, J. P. Supplementary list of plants from southeastern Alaska. Proc. Iowa Acad. Sci. 26: 327-331. 1919.

3523. ANTHONY, H. F. From humid forest to snow-capped height in Ecuador. Nat. Hist. 21: 459-473. Pl. 13. 1921.—While this paper is concerned with the physiography and natural history of the region, considerable attention is devoted to the botanical features. The paper is illustrated with excellent half-tones.—*Albert R. Sweetser.*

3524. BEGUINOT, AUGUSTO. Viaggio di Leonardo Fea nell'Africa occidentale. Contributo alla flora delle isole del Capo Verde e notizie sulle sua affinità ed origine. [Contribution to the flora of the Cape Verde Islands.] Ann. Mus. Civico Storia Nat. Genova III, 8: 9-73. 1918-1920.—In addition to an enumeration of the plants collected by Fea, the history of previous botanical exploration in the islands is given, followed by a discussion of the relationships and origin of the species found.—*Edith K. Cash.*

3525. BEWS, J. W. The flora of Natal and Zululand. vi + 248 p. City Printing Works: Pietermaritzburg, Natal, 1921.—This is a list of the Natal and Zululand flora with keys to families and genera.—*E. P. Phillips.*

3526. BORN-MÜLLER, J. Kleiner Beitrag zur Kenntnis der Flora des Steppengebiets am oberen Euphrat sowie Nord-Syriens. [A small contribution to the knowledge of the flora of the steppes and the upper Euphrates and North Syria.] Beih. Bot. Centralbl. II Abt. 38: 431-457. Pl. 3. 1921.—Thirty-two families are listed with from 1 to 17 species in each.—*L. Pace.*

3527. BRADSHAW, R. V. *Cynosurus echinatus* in Oregon. Torreyia 21: 81-83. 1921.—*Cynosurus echinatus* L. was found in June, 1919, on the dry slope of Skinner's Butte, Eugene, Oregon, and has since become thoroughly established. It has also been found on Spencer's Butte, 6 miles south of Eugene. It has been previously reported from British Columbia by J. K. Henry and from California by Alice Eastwood. No specimens from the U. S. A. are found in the Gray Herbarium or that of the New York Botanical Garden. The species differs from *C. cristatus* chiefly in its long prickly awns and compact panicles.—*J. C. Nelson.*

3528. BRADSHAW, R. V. Notes on Oregon plants. Amer. Bot. 27: 126-128. 1921.—Among the plants rarely found in Oregon are the red alga, *Lemanea fucina rigida*, *Anthriscus Anthriscus*, *Cogswellia microcarpa*, *Scandix pecten-veneris*, *Mimulus cardinalis*, and *Ceanothus cuneatus*.—*S. P. Nichols.*

3529. BRADSHAW, R. V. Oregon willows. Amer. Bot. 27: 56-59. 1921.—A statement of the species found at Eugene, Oregon, is given.—S. P. Nichols.

3530. CLUTE, W. N. Midsummer flora of Tuba Oasis. Amer. Bot. 27: 41-47. 1921.—A description of the oasis and a list of the plant species are given.—S. P. Nichols.

3531. CLUTE, W. N. Midsummer flora of Tuba Oasis. Amer. Bot. 27: 101-104. 1921.

3532. CONSTANTIN, J. Sur la biologie alpestre. [On alpine biology.] Compt. Rend. Acad. Sci. Paris 173: 537-540. 1921.—Notes are given on a trip through the Alps of Vanoise. An alpine variety of *Pleurotus Eryngii* was found. Other fungi are reported to show nanism.—C. H. Farr.

3533. DIEHL, WM. W. The flora of the Ledges. Rept. Iowa State Bd. Conservation 1919: 122. 1920.—The author gives a list of plants on the Carboniferous sandstone such as *Polypodium vulgare*, *Camptosorus rhizophyllus*, *Mitella diphylla*, *Prunus pennsylvanica*, *Dicranopalustris*, *Rhamnus lanceolata*.—L. H. Pammel.

3534. DRUCE, G. CLARIDGE. *Matricaria suaveolens* Pursh, in Britain. Gard. Chron. 69: 187-188. 1921.—This plant is of North American origin and not identical with *Matricaria suaveolens* Linn., which Richter regards as a synonym of *Anthemis nobilis*. It was first found in England by J. G. Baker in 1871. Additional collections up to 1920 showing its rapid spread are noted.—P. L. Ricker.

3535. DUFRET, H. Notes upon the Drepanocladi of the vicinity of Montreal, Quebec, Canada. Bryologist 24: 36-39. 1921.—The Drepanocladi of the vicinity of Montreal are grouped by the author under 6 major species, with numerous varieties and forms. There are short notes upon the gross appearance of each group mentioned, with some mention of the special habitat preferences.—E. B. Chamberlain.

3536. EKBLAW, W. ELMER. Plant life of northwest Greenland. Nat. Hist. 19: 272-291. 20 pl. 1919.—There have been described 120 species flowering in the short 2-months season. Of these the writer describes and photographs many both as individuals and in their environment, including *Agaricus campestris*.—Albert R. Sweetser.

3537. EYLES, F. Constituents of the flora of southern Rhodesia. South African Jour. Sci. 17: 181-184. 1921.—Speaking generally, southern Rhodesia belongs to the great Central African Plateau, with an altitude of 3,000-5,000 feet and an annual rainfall of 15-40 inches. The partial analysis of the flora shows that 70 per cent of the whole flora is comprised within 20 families, the remaining 30 per cent being spread over no less than 122 families. Gymnosperms are represented by only 2 species, and the proportion of monocotyledons and dicotyledons is as 1: 3.84. There can be little doubt that the southern and western districts will be found to have close affinity with the northern parts of the Union, and particularly with the region sometimes spoken of as the Kalahari, while the northern one will be found closely related to the Central African flora, and the eastern coast-belt nearly akin to the south-east coast region of the Union.—E. P. Phillips.

3538. FIESTER, MRS. CHARLES. The wild flowers of Iowa. Rept. Iowa State Hort. Soc. 54: 232-236. 1919.—Popular.—L. H. Pammel.

3539. FISHER, G. CLYDE. A station for the Ram's-Head Lady's-Slipper. Torreyana 21: 63-64. 1921.—Recently a colony of 50 or more plants of *Cypripedium arietinum* R. Br. was discovered by P. D. Fagans near Westport-on-Lake Champlain, New York, in a hillside woods near the lake beach.—J. C. Nelson.

3540. FITZPATRICK, T. J. The fern flora of Nebraska. *Proc. Iowa Acad. Sci.* 26: 311-326. 1919.—The article outlines the ecologic regions of the state and gives a list of 26 species. The known localities for each are listed.—*H. S. Conard.*

3541. FRUHSTORFER, H. Tessiner Wanderhilder: III. Der Monte Salvatore. (Mit orthopterologischen, malacologischen und herpetologischen Mitteilungen.) [Ticinian travel pictures: III. Monte Salvatore. (With orthopterological, malacological, and herpetological contributions.)] *Arch. Naturgesch. Abt. A* 86: 104-113. 1920 [1921].—Notes are included of the plants observed at various altitudes.—*C. E. Allen.*

3542. FULLER, GEORGE D. Montane plants of the Rocky Mountains. [Rev. of: RYDBERG, P. A. *Phytogeographical notes on the Rocky Mountain region. VIII. Distribution of the montane plants.* *Bull. Torrey Bot. Club* 46: 295-327. 1919 (see *Bot. Absts.* 4, Entry 364).] *Bot. Gaz.* 69: 360. 1920.

3543. GUPPY, H. B. The testimony of the endemic species of the Canary Islands in favour of the age and area theory of Dr. Willis. *Ann. Botany* 35: 513-522. 1921.—The number of species confined to the Canary Islands is about 400. The number of species found in the Canaries and other islands of the Macaronesian floral region (Azores, Madeiras, and Cape Verde Islands) but confined to the Macaronesian region is about 50. A list of the latter is given. Tables are also given showing the number of species of both these groups confined to 1, 2, 3, etc., islands of the Canaries. Whereas only 10 per cent of the Macaronesian endemics are confined to 1 island, between 60 and 65 per cent of the Canarian endemics are known from only a single island. Evidence is given to show that the widely distributed Macaronesian endemics are the remains of an ancient continental flora, while the Canarian endemics are young species in early stages of spreading. The role of highly variable, widely ranging species in the production of new forms is emphasized and illustrated.—*W. P. Thompson.*

3544. HARLAN, E. R. The Red Rock region. *Rept. Iowa State Bd. Conservation* 1919: 100-102. 1920.—This article gives an account of the redrock sandstone of the region and its relation to plant life.—*L. H. Pammel.*

3545. HENNING, CARL F. The Ledges, nature's gift to Iowa. *Rept. Iowa State Bd. Conservation* 1919: 116-121. 1920.—This is a running account of the plants of the Ledges in Boone County and of the coal measure sandstone, as well as of the animal life.—*L. H. Pammel.*

3546. HENRARD, J. TH., P. JANSEN, W. H. WACHTER, en A. W. KLOOS, JR. Over de flora van Zuid-Limburg en een harer pioniers. [On the flora of Southern Limburg and one of its pioneers.] *Levende Natuur* 26: 81-83. 1921.—A general and popular consideration is given of the flora of southern Limburg, Netherlands.—*J. C. Th. Uphof.*

3547. HUNNEWELL, FRANCIS W. An extended range for *Amelanchier amabilis*. *Rhodora* 23: 71-72. 1921.—A new station for this species is reported at Cooperstown, Otsego County, New York. The species has not before been reported east of Ithaca, New York.—*James P. Poole.*

3548. LANGE, AXEL. Vegetationen paa Tunø og Hjelm. [Vegetation of Tunø and Hjelm.] *Bot. Tidsskr.* 37: 1-22. 1920.—During the summer of 1917 an investigation was made of the flora of 2 small islands about 3 mile from Sansø and accessible by motor boat from Aarbus. A description of the physiographic features of the islands with their plants is given. For the entire island of Tunø 412 species are listed; for Hjelm, 115 species. Seventeen species found upon Hjelm are not present on Tunø. According to various historical accounts these islands were at one time heavily timbered.—*A. L. Bakke.*

3549. LAZELL, FRED J. The palisades of the Cedar River. Rept. Iowa State Bd. Conservation 1919: 95-98. 1920.—The author describes the Palisades as similar in appearance to those of the Hudson. The cliffs are of the upper Silurian dolomite. He records *Viburnum dentatum*, *Polypodium vulgare*, *Cystopteris fragilis*, *C. bulbifera*, *Woodsia obtusa*, and *Asplenium angustifolium* on the rocks, and in shady ravines, *Hydrophyllum virginianum* and *H. appendiculatum*.—L. H. Pammel.

3550. LEES, JAMES H. Supplementary report of the Devil's Backbone. Rept. Iowa State Bd. Conservation 1919: 45-46. 1920.—An account is given of the rock formation. The somewhat rare plants for Iowa, *Pinus Strobus* and *Taxus canadensis*, are mentioned.—L. H. Pammel.

3551. LUTZ, F. E. Geographic average, a suggested method for the study of distribution. Amer. Mus. Novitates 5. 7 p. 1921.—This is a method which appears to give the best promise of obtaining a concrete expression of an area. The geographical average is the average of the limits of distribution in latitude and longitude. As an example, the plants of Britton and Brown, Illustrated Flora, Vol. 2 (Portulacaceae to Papilionaceae), are so determined. Those occurring in the following regions have the distribution given:

	GEOGRAPHIC AVERAGE		AVERAGE RANGE	
	Lat.	Long.	Lat.	Long.
Labrador.....	51°	89°	20°	79°
Newfoundland.....	48°	87°	20°	70°
Nova Scotia and New Brunswick.....	45°	87°	19°	56°
New England.....	42°	85°	17°	44°
Maryland, Virginia, and Delaware.....	39°	85°	14°	28°

This shows a narrower range in both latitude and longitude for the plants of more southern regions. In further discussion of the data, the plants of the different regions are separated as to northward and southward extensions of range and similar differences are found in these groups. The data yield the following provisional latitudinal averages for the life zones of Merriam: Arctic, more than 52°; Hudsonian, 48° or 49°; Canadian, 44° or 45°; Alleghanian, 41° or 42°; Carolinian, 38° or 39°; Austroriparian, less than 34°. Corrections for altitude are not yet worked out. The mean of the geographical average of the plants of a particular association would give a value for the association as a whole.—O. A. Stevens.

3552. MARTIN, W. Unrecorded plant habitats for the eastern botanical district of the South Island of New Zealand. Trans. and Proc. New Zealand Inst. 53: 383-385. 1921.—Sixty-seven spermatophytes and ferns are listed as new or rare in this district.—Wm. Randolph Taylor.

3553. MERRILL, E. D. A bibliographic enumeration of Bornean plants. Jour. Roy. Asiatic Soc. Straits Branch. Special number. 637 p. 1921.—The enumeration closes with the end of 1917. It contains 4937 species of phanerogams; cryptogams are not included. In an introduction the author calls attention to the distribution of about 135 species as common to and confined within Borneo, the Malay Peninsula, and Sumatra, and to the smaller number, about 60 species, common to and confined within Borneo and the Philippine Islands. He notes that the Asiatic element is smaller in Borneo than in Java, and gives an account of the Australian element in Borneo, which, though found chiefly on the high mountains, is nevertheless present in the mangrove forests upon the coasts; it is less developed in Borneo than in the Philippines. The specific endemism he calculates at about 40 per cent, against 60 per cent in the Philippine Islands and 50 per cent in the Malay Peninsula; but there are conspicuously more endemic genera in Borneo than in the Philippine Islands.—I. H. Burkhill.

3554. MOXLEY, GEORGE L. An excursion in the San Gabriels. Amer. Bot. 27: 134-138. 1921.

3555. PAIGE, F. W., and F. E. DRAKE. Wild Cat Cave and Woodman's Hollow. Rept. Iowa State Bd. Conservation 1919: 91-92. 1920.—*Asplenium Filix-foemina*, *Osmunda Claytoniana*, *Dryopteris Goldiana*, and *Camptosorus rhizophyllus* are listed.—L. H. Pammel.

3556. PAMMEL, L. H. Bixby Park, Clayton County. Rept. Iowa State Bd. Conservation 1919: 144-146. 1920.—An interesting area for a valley-prairie region is found in Clayton county, where there is a narrow limestone escarpment and an ice cave. Among plants noted are *Cystopteris fragilis*, *C. bulbifera*, *Adiantum pedatum*, *Woodsia obtusa*, *Lonicera Sullivanii*, *L. glauca*, *Taxus canadensis*.—L. H. Pammel.

3557. PAMMEL, L. H. Botany of the Devils Backbone area in Madison County. Rept. Iowa State Bd. Conservation 1919: 166-167. 1920.—This paper should be considered in connection with the paper by J. H. Lees [see Bot. Absts. 11, Entry 3550] on the geology. The area is a typical prairie on a narrow ridge. *Lespedeza violacea*, *Psoralea lanceolata*, and *Scutellaria parvula* are noted; and adjacent to the prairie, *Quercus alba*, *Q. rubra*, *Q. acuminata*, *Q. velutina*, *Ulmus racemosa*, *U. fulva*, *U. americana*, *Fraxinus americana*, and *Tilia americana*.—L. H. Pammel.

3558. PAMMEL, L. H. Flora of Jackson and Dubuque Counties. Rept. Iowa State Bd. Conservation 1919: 79-81. 1920.—The author gives a running account of the plants of the region, noting *Quercus macrocarpa*, *Q. velutina*, *Q. rubra*, *Q. alba*, *Q. ellipsoidalis*, *Q. palustris*, *Q. acuminata*, *Fraxinus americana*, *Rhamnus lanceolata*, *Platanus occidentalis*, *Tilia americana*, *Asimina triloba*, and the American lotus. The papaw is native at Dubuque and is reported as far north as McGregor, where it was probably planted by Indians.—L. H. Pammel.

3559. PAMMEL, L. H. Flora of the bogs of Cerro Gordo and Worth Counties. Rept. Iowa State Bd. Conservation 1919: 171. 1920.—Not so long ago these bogs were lakes. The present flora is a typical boreal bog flora. Among the plants noted are *Cirsium muticum*, *Salix candida*, *S. Richardsonii*, *S. discolor*, *Cicuta bulbifera*, *Bidens Beckii*, *Gentiana crinita*, *Bromus Kalmitii*, and *Populus tremuloides*. There is, however, no sphagnum as in the Wisconsin and Minnesota peat bogs. A species of *Hyphnum* is common.—L. H. Pammel.

3560. PAMMEL, L. H. Forest flora of Hardin County. Rept. Iowa State Bd. Conservation 1919: 113-115. 1920.—The occurrence of *Pinus Strobus*, *Betula papyrifera*, and *B. lutea* is noted. This is the most outlying distribution of the white pine west of the Mississippi River with the exception of Muscatine County. The flora associated with the white pine and birch includes *Phegopteris Dryopteris*, *Aspidium marginale*, *Cypripedium spectabile*, *Cornus circinata*, and *Diervilla trifida*.—L. H. Pammel.

3561. PAMMEL, L. H. Forest trees and shrubs in Boone County. Rept. Iowa State Bd. Conservation 1919: 121. 1920.—An account is given of the trees of the Ledges including *Ulmus fulva*, *U. americana*, *U. racemosa*, *Quercus rubra*, *Q. alba*, *Q. acuminata*, *Q. macrocarpa*, *Juglans cinerea*, *Ostrya virginiana*, *Carpinus caroliniana*.—L. H. Pammel.

3562. PAMMEL, L. H. Reindeer lichens at the Ledges. Rept. Iowa State Bd. Conservation 1919: 116. 1920.—Note is made of the occurrence of the reindeer lichen on the Carboniferous sandstone at the Ledges.—L. H. Pammel.

3563. PAMMEL, L. H. Report on Wild Cat Den. Rept. Iowa State Bd. Conservation 1919: 72-76. 1920.—A list is given of the rare plants found on the Carboniferous sandstone in the Pine Creek region, such as *Trillium sessile*, *T. grandiflorum*, *Maianthemum canadense*, *Aster macrophyllus*, *Rhexia virginica* (found in the vicinity), *Symplocarpus foetidus*, *Pentstemon*

grandiflorus (sandy soil, Muscatine Island), *Gaylussacia baccata*, *Lespedeza violacea*, *L. reticulata*, *Aspidium Goldianum*, *A. spinulosum*, *A. acrostichoides*, *Circaea alpina*, *Lycopodium lucidulum*, *L. complanatum*, and *Phegopteris polypodioides*.—L. H. Pammel.

3564. PAMMEL, L. H. The barberry in Iowa and adjacent states. *Proc. Iowa Acad. Sci.* 26: 193-237. 1919.—This article gives the history of the early plantings of barberry species in Iowa. The author finds that "it is impossible for one to determine the age of the common barberry from the annual rings." Twenty-two localities are described where barberry grows wild.—H. S. Conard.

3565. PAMMEL, L. H. The loess area of Western Iowa. *Rept. Iowa State Bd. Conservation* 1919: 55-87. 1920.—The paper gives a list of the characteristic flora of the loess: *Lygodesmia juncea*, *Aplopappus spinulosus*, *Dalea laxiflora*, *Oxytropis Lamberti*, *Liatris punctata*, *Yucca glauca*, *Sporobolus cuspidatus*, *Salvia lanceolata*, *Petalostemon multiflorus*, *Euphorbia Geyeri*, *E. marginata*, *Helianthus Maximiliani*, *Glycyrrhiza lepidota*, *Callirhoe involucrata*, *Gaura coccinea*, *Cirsium canescens*.—L. H. Pammel.

3566. PAMMEL, L. H. The lower Des Moines area. *Rept. Iowa State Bd. Conservation* 1919: 65-69. 1920.—An account is given of the trees embracing the area between Keosauqua and Croton, Iowa, on the Des Moines River. The following species of oaks are given for Keosauqua: *Quercus palustris*, *Q. ellipsoidalis*, *Q. velutina*, *Q. rubra*, *Q. alba*, *Q. platanoidea*, *Q. acuminata*, and *Q. macrocarpa*. Reference is made to the soils and to the plants found associated with various soils.—L. H. Pammel.

3567. PAMMEL, L. H. The Monkey Mountain area near Ottumwa. *Rept. Iowa State Bd. Conservation* 1919: 152. 1920.—This contains a brief list of plants found on the Carboniferous sandstone near Ottumwa. It is not unlike the flora found on similar rock types.—L. H. Pammel.

3568. PAMMEL, L. H. Woodman's Hollow and Wild Cat Den. *Rept. Iowa State Bd. Conservation* 1919: 87-89. 1920.—Many interesting plants are listed, common names only being given. The Carboniferous sandstone is inhabited by the alternate leaved dogwood, silky cornel, walking leaf and the ostrich ferns.—L. H. Pammel.

3569. PAMMEL, L. H. Yellow River region in Allamakee County. *Rept. Iowa State Bd. Conservation* 1919: 163. 1920.—This paper describes a stretch of Balsam fir woods (*Abies balsamea*) on the north slope of the Yellow River, with associated plants: *Corylus rostrata*, *Pinus Strobus*, *Betula papyrifera*, *Poa nemoralis*, *Aconitum uncinatum*, *Taraxacum canadense*, *Sambucus racemosa*, *Arabis lyrata*, *Circaea alpina*, *Viola blanda*, *Phegopteris cucullata*.—L. H. Pammel.

3570. PECK, M. E. Study of a section of the Oregon coast flora. *Proc. Iowa Acad. Sci.* 26: 337-362. 1919.—This paper gives an ecologic study of the flora of a coastal area in Lincoln County, between Yaquina Head and Yachats River, with a list of species collected, and habitats.—H. S. Conard.

3571. PHILLIPS, E. P., and J. J. KOTZE. The occurrence of "Terblanz" (*Faurea Macnaughtonii*) in Natal and Pondoland. *South African Jour. Sci.* 17: 221. 1921.—The Knysna "Terblanz" appears in the Knysna forest, then appears in the Pondoland forests, and reappears in the Ngomi forest in Northern Natal.—E. P. Phillips.

3572. POPPELWELL, D. L. Notes on the indigenous vegetation of Ben Lomond, with a list of species. *Trans. and Proc. New Zealand Inst.* 52: 248-252. 1920.—Ben Lomond is a locality in the neighborhood of Queenstown frequently visited by botanists, but of which no list of plants has previously been published. In this article there are listed 25 pteridophytes, 3 taxads, 17 monocots, and 119 dicots, with their habitats and relative frequency of occurrence.—Wm. Randolph Taylor.

3573. POPPELWELL, D. L. Notes on the indigenous vegetation of the north-eastern portion of the Hokonui Hills, with a list of species. Trans. and Proc. New Zealand Inst. 52: 239-247. 1920.—These hills extend from near the coast inland for about 30 miles. The area dealt with reaches an altitude of slightly over 2000 feet above sea-level, and is mainly upland cut by valleys with constant streams, though containing several acres of bush. The varied soils and situations support a large flora, the introduced plants of which are not considered in this paper. Of indigenous species and varieties, there are 39 pteridophytes, 6 taxads, 57 monocots, and 181 dicots, the relative abundance and habitat for each of which is given.—*Wm. Randolph Taylor.*

3574. PREAUBERT, E. Relevé d'herborisations en Anjou de 1914 à 1917. (Flore vasculaire.) [Abstract of collections made in Anjou from 1914 to 1917. Vascular flora.] Bull. Soc. Etudes Sci. Angers 49: 1-14. 1920.—The author observes the invasion of the local flora by exotics, promoted especially by human agencies such as railroad traffic. This is bound to be especially true in years following the war, when it may be expected that North American species will appear around cantonments occupied by the allies of the French. Usually these exotics tend to disappear, but occasionally a species will become acclimated, or even develop into a nuisance. New locations for 54 species are recorded, as well as the occurrence of a species, *Oenanthe filipenduloides* Thuil., new to the district.—*Charles Drechsler.*

3575. ROSENVINGE, L. KOLDERUP. Om nogle i nyere Tid indvandrede Havalger i de danske Farvande. [Marine algae recently introduced into Danish waters.] Bot. Tidsskr. 37: 125-135. 1920. [With English abstract.]—Well-known examples of the migration of marine algae are recorded, such as the appearance of *Bonnemaïsonia hamifera* Hariot, a Japanese species, along the southern shores of the British Isles and of the Mediterranean *Colpomenia sinuosa* (Roth) in the English Channel in 1905. Among the recent introductions into Danish waters are: (1) *Gigartina mamillata* (G. & W.) J. Ag., reported at Thisted by I. P. Jacobsen in 1899 and by the author as abundant in 1890-93. In 1912 and in 1915 it was also found at Aarhus. (2) *Trailiella intricata* Batters was first reported by the author in 1901, in the Limfjord where it became abundant by 1912. It was first found in the Kattegat by Petersen, in 1900, and has since become abundant there although it is always sterile in Danish waters. (3) *Codium tomentosum* (Huds.) Stackh. was seen by the author at Hørsholm near Frederikshavn, in 1910, growing on wood and pebbles in the harbor. As this locality is not visited by vessels from foreign waters it is thought that it may have been introduced with the establishment of a field of mines during the war. (4) *Codium mucronatum* J. Ag., a New Zealand species, reported by Cotton, in 1912, along the coast of Ireland and Scotland, was collected by several investigators in the Limfjord in the summer of 1920, doubtless introduced by ships from more western waters.—*A. L. Bakke.*

3576. SANDS, W. N. Plants common to the West Indies and Malaya. Agric. News [Barbados] 20: 163, 182-183. 1921.—Although in no sense a comprehensive study, the article nevertheless gives an interesting account of the principal economic plants, flowering trees, and wild plants which the author has found from his own experience to be common to both regions.—*J. S. Dash.*

3577. SCHONLAND, S. Note on the Crassulaceae found in Rhodesia. South African Jour. Sci. 17: 186-188. 1921.—Judging by present knowledge, the number of Crassulaceae in Rhodesia is very small and reflects the general distribution. Species of *Bryophyllum* (now placed under *Kalanchoe*), *Sedum*, and *Sempervivum* are absent. *Cotyledon* is very poorly represented. There is nothing in the configuration of the country, nor in the climate, that, as far as can be judged, is in any way a hinderance to the growth of numerous Crassulaceae, and, as there is an almost complete absence of endemism, it may be permissible to conclude that at all events the Crassulas have reached the country at a comparatively recent period.—*E. P. Phillips.*

3578. SHINLEY, JOHN. A preliminary list of plants of the National Park, Macpherson Range. Proc. Roy. Soc. Queensland 31: 21-27. 1919.—A catalogue is given of the native plants of Queensland, collected in the National Park at an altitude of 3000-3600 feet during a 5-weeks' holiday. Two climbing plants hitherto unrecorded for Queensland are reported. No new species are described.—J. H. Faull.

3579. SIM, T. R. South African fern notes, with a list of ferns and fern allies found in southern Rhodesia, and of additional species recorded for other South African phytographic areas. South African Jour. Sci. 17: 275-284. 1921.—The older coastal areas, i.e., West, East, Kaffraria, and Natal, which were carefully worked years ago, provide very little additional material, but the inland and northern areas continue to have increasing lists of species found, and probably will do so for years as localities become more accessible, since the fern flora is richer in species in the tropics. One additional species is recorded for the whole of South Africa, i.e., a small *Scelaginella* found in Basutoland.—E. P. Phillips.

3580. SKOTTE, HARALD. Nya fyndorter för lind og lönn i Ångermanland. [New localities for the linden and maple in Ångermanland (a province in northern Sweden).] Bot. Notiser 1920: 215. 1920.—Both species were found on the mountain Lillruten, not far from the village of Magdabäcken, 5 km. northeast of Skuleberget, at 63°5' N. latitude.—P. A. Rydberg.

3581. STEPHENSON, T., and T. A. [STEPHENSON.] *Orchis praetermissa* Druce and *O. purpurella* Stephenson. Jour. Botany 59: 234. 1921.—New stations for the occurrence of these species in Holland are noted.—Adele Lewis Grant.

3582. TAYLOR, NORMAN. Endemism in the Bahama flora. Ann. Botany 35: 523-532. 1921.—Of the 894 native species of flowering plants in the Bahamas, 132 are endemics. A comparison of the endemics and non-endemics in regard to degree of dispersal shows that they are not very different, the percentages confined to 1, 2, or 3 islands being about the same in the 2 cases. It is concluded in opposition to the age-and-area hypothesis that the age of the endemics cannot be measured either by their degree of dispersal or by their frequency. In spite of the youth of the islands 57 per cent of the endemics are woody while only 39 per cent of the non-endemics are woody. Evidence is adduced to show that endemism is the response of the vegetation to peculiar conditions of soil, lack of rainfall, regular trade winds, and violent hurricanes.—W. P. Thompson.

3583. TURRILL, W. B. A new European plant. Kew Bull. 1921: 128. 1921.—This paper records the discovery on Cape Hellas, Gallipoli, of *Gonocytisus angulatus* Spach., a species previously known only in Asia Minor.—E. Mead Wilcox.

3584. TURRILL, W. B. *Cardamine pratensis uniflora* in Britain. Kew Bull. 1920: 223. 1920.

3585. TURRILL, W. B. *Carex riparia* var. *gracilis*, in Britain. Kew Bull. 1920: 141-142. 1920.

3586. TUTTLE, FLORA MAE. Flora of Mitchell County. Rept. Iowa State Bd. Conservation 1919: 142-144. 1920.—This is a short account of the plants of the region. [See also following entry.]—L. H. Pammel.

3587. TUTTLE, FLORA MAE. Flora of Mitchell County. Proc. Iowa Acad. Sci. 26: 269-299. 1919.—After a brief non-technical description of the terrain, the author lists 15 species of fern allies, 3 of gymnosperms, and 478 of angiosperms, with a locality for each.—H. S. Conard.

3588. WALL, A. New plant stations. Trans. and Proc. New Zealand Inst. 53: 426-428. 1921.—Records are given for 86 phanerogams and ferns including 2 introduced species.—Wm. Randolph Taylor.

3589. WALL, A. *Ranunculus paucifolius* T. Kirk: its distribution and ecology, and the bearing of these upon certain geological and phylogenetic problems. Trans. and Proc. New Zealand Inst. 52: 90-105. Pl. 2-5. 1920.—*Ranunculus paucifolius* T. Kirk, is closely related to *R. chordorhizos* Hook. f., differing in its more coriaceous habit, fewer and more entire leaves, longer scape and broader petals. It occurs only in the Trelissick Basin, mostly on ground that has a slope of 6°-8°. The soil is very loose and drifting debris from Tertiary limestone which, in the areas where *R. paucifolius* occurs, supports a very scant flora. Distribution of this plant and those associated with it seems to be only by drifting of the soil and the admixed seeds before the wind. The author considers that this and similar areas represent the remnants of a once extensive and rather level area of limestone beds since mostly removed by erosion. They have passed through a succession of mesophytic and xerophytic or "steppe climate" conditions which only *R. paucifolius* and a few associated species have survived. The origin of *R. paucifolius* is considered to have been by mutation previous to the xerophytic period, not by gradual adaptation to it.—Wm. Randolph Taylor.

3590. WARD, F. KINGDON. On the road to Htawgaw. Gard. Chron. 69: 186. 1921.—This article gives general descriptions of the topographic features and floral aspects of the country through which the expedition passed.—P. L. Ricker.

3591. WILLIS, J. C. Endemic genera of plants in their relation to others. Ann. Botany 35: 493-512. 6 fig. 1921.—In answer to frequent inquiries a summary is first given of the hypothesis of "age and area" and of the evidence which has been advanced from time to time in support of it. The rest of the paper is an attempt to extend the hypothesis to endemic genera the world over, the previous work having dealt with species of restricted areas. Evidence is given to show that most endemic genera are young and in the early stages of spreading, not relics which have been exterminated elsewhere, as is commonly believed. It is pointed out that if endemic genera are survivals they should belong mainly to small families of broken distribution which are considered unsuccessful and moribund, and not to large and successful families, such as Compositae and Rubiaceae; but if they are young they should appear in families in proportions not dissimilar to the proportions of genera appearing in those families at the present time. This test is first applied to all the endemic genera of all the islands in the world. It is shown that the island endemics occur chiefly in the largest families, and in rough proportion to the actual totals of genera contained in them. The small families and those of disconnected distribution are very poorly represented. Other regions of the world are treated similarly and it is found that endemic genera appear in regular proportion to the totals of genera in the families to which they belong. It is concluded that such genera cannot be survivals but are really young and in the early stages of dispersal. It is not denied that relic endemic genera exist but it is held that they are comparatively unimportant. In a postscript it is added that further work has revealed the presence of many relics in temperate North America.—W. P. Thompson.

3592. WOLDEN, B. O. The moss and lichen flora of western Emmet Co. Proc. Iowa Acad. Sci. 26: 259-267. 1919.—The author enumerates 49 species of lichens, 4 of hepatics, and 33 of bryales, with notes on the habitat of each.—H. S. Conard.

3593. YOUNG, MARY SOPHIE. The seed plants, ferns and fern allies of the Austin [Texas] region. Univ. Texas Bull. 2065. 98 p. 1920.—This publication is based on the author's own collections during 6 years and the collections in the University of Texas herbarium made by her predecessors. It consists of a list of the plants in the groups, giving family, scientific and common name, habitat, and distribution. About 730 species are listed, practically all angiosperms. In the pteridophytes and gymnosperms are 1 *Opbioglossum*, 1 *Anemia*, 8

Polypodiaceae, 1 Marsilea, 1 Equisetum, 2 Selaginellas, 3 Juniperaceae, and 1 Ephedra.—The manuscript was ready for publication at the author's death and is issued by B. C. THARP, one of her students.—*L. Pace.*

APPLIED ECOLOGY

3594. ALFONSUS, ALOIS. *De Hemelboom (Ailanthus glandulosa)*. [The Tree of Heaven.] *Practische Imker* 5: 85. 1921.—A report is given on the excellent honey-producing qualities of this tree with a recommendation for its general planting for shade and honey.—*M. G. Dadant.*

3595. ALFONSUS, ALOIS. *Der Götterbaum (Ailanthus glandulosa)*. [The Tree of Heaven.] *Leipziger Bienenzeitg.* 36: 122. 1921.—An appeal is made for the general planting of this tree, showing its desirability as an addition to the honey flora of northern Europe.—*M. G. Dadant.*

3596. BALDWIN, F. M. Velvet beans. *Dixie Beekeeper* 57: 20. 1921.—The nectar gathered from velvet bean is so thin that it will run in streams from the combs if they are turned horizontally. The cappings of the comb honey are very white, but the extracted honey is light red in color.—*J. H. Lovell.*

3597. CALE, G. H. *Beekeeping in Maryland*. *Amer. Bee Jour.* 61: 305-308. *Fig. 1-4.* 1921.—The general conditions and the nectar resources of Maryland are outlined. According to its physical features the state is divided into 3 regions: the Coastal Plain, the Piedmont Plateau, and the Mountainous Region. The most important honey plants are white clover, alsike clover, and tulip-tree. The clovers are common in the Midland Region (Piedmont Plateau) where dairying is an important industry, but as the soil is deficient in lime they secrete nectar less freely than in the glacial soils of Minnesota and Wisconsin. The mean daily temperature also during June and July is usually not long favorable to nectar secretion. A good crop is obtained about once in 3 years. Tulip-tree (*Liriodendron tulipifera*) on the hillsides of the lower Midland Region is one of the predominating species, often forming 80 per cent of the forest. It is less abundant in the upper Midland Region, and in the Mountainous Region it is either rare or absent. It is a very reliable honey plant, yielding a large quantity of nectar; the honey is dark amber.—The largest apiaries are located near the cities of Washington, Baltimore, Frederick, Hagerstown, and Cumberland. The average yield of honey per colony is only about 30 pounds, due to the fact that the honey flow comes very early, before the colonies are sufficiently strong to take advantage of it.—At the close of the paper a list of the honey plants of Maryland is given with brief comments on their distribution and value.—*J. H. Lovell.*

3598. CLAUSTRE, R. *Apiarian flora*. *Amer. Bee Jour.* 61: 402. 1921.—*Malope (Malope malacoides)* is an excellent honey plant in France, but it would be inadvisable to introduce it into the U. S. A.—*J. H. Lovell.*

3599. COLEMAN, GEO. A. *Beekeeping in our California national forests No. II. Honey flora*. *Western Honey Bee* 9: 215-217. 1921.—Growing on dry sandy or gravelly soils in the arid region of the Colorado Basin to San Diego County, screw-pod mesquite (*Stromboscarpa odorata*) yields a light amber honey of good quality. A similar honey is obtained from Texas mesquite on the plains, mesas, and canyons of southern California where it blooms from May to July. California red-bud (*Cercis occidentalis*) extends from the region around Mt. Shasta to San Diego County. The honey is light in color with a pleasant flavor and is valuable for early brood-rearing. In southeastern California catsclaw (*Acacia Greggii*) yields an excellent white honey. Retama or horse-bean (*Parkinsonia aculeata*) is also a valued honey plant in southern California.—*J. H. Lovell.*

3600. COLEMAN, GEO. A. *Beekeeping in our California national forests No. II. Honey flora*. *Western Honey Bee* 9: 247-249. 1921.—Palo verde (*Cercidium Torreyanum*) in the

deserts of southern California, Arizona, and Sonora yields a light colored honey of good quality. Pea chaparral, one of the most characteristic of the chaparral shrubs, forms dense thickets in the Coast Ranges. Other well-known and valuable honey plants are alfalfa, white sweet clover, the annual yellow sweet clover, and hurr-clover (*Medicago hispida*). Indigo bush (*Dalea spinosa*) and Mexican ironweed (*Oleia tesota*) are also listed.—J. H. Lovell.

3601. COLEMAN, GEO. A. Beekeeping in our California national forests No. II. Honey flora. Western Honey Bee 9: 280-282. 1921.—There are many species of clover (*Trifolium*) in California, but their value as honey plants is very imperfectly understood. Deer-weed or wild alfalfa (*Lotus glaber*), common in the Coast Ranges, yields a water-white honey, which granulates in a few months. Five species of sumac (*Rhus*) and 4 of maple (*Acer*) are reported to furnish considerable surplus.—J. H. Lovell.

3602. COLEMAN, GEO. A. Beekeeping in our California national forests No. II. Honey flora. Western Honey Bee 9: 312-313. 1921.—The range of the California buckeye (*Aesculus californica*) is given in detail in order that beekeepers may avoid locating near it if they so desire. There has been much complaint that many bees perish while gathering the nectar of buckeye. Other reports affirm that a surplus of 25 pounds per colony has been obtained without loss of bees. Madrona (*Arbutus Menziesii*), one of the handsomest shrubs in California, is the source of a golden amber-colored honey with a very heavy body and a delicious peculiar flavor, which easily distinguishes it from all other honeys.—J. H. Lovell.

3603. COLEMAN, GEO. A. Beekeeping in our California national forests No. II. Honey flora. Western Honey Bee 9: 344-346. 1921.—In this installment of his review of the honey plants of California, the author considers the manzanitas, buckthorns, and species of *Ceanothus*. Four species of manzanita are listed. The common manzanita (*Arctostaphylos Manzanita*) secretes nectar so freely that it can be shaken from the flowers like dew. Three species of buckthorn (*Rhamnus*) are valuable,—cascara sagrada (*R. purshiana*), coffeeberry (*R. californica*), and red berry (*R. crocea*). *Ceanothus*, or mountain lilac, is represented in California by numerous species, 6 of which are listed as honey plants; they yield a white or light-colored honey with a delicious flavor.—J. H. Lovell.

3604. COLEMAN, GEO. A. Beekeeping in our California national forests No. II. Honey flora. Western Honey Bee 9: 376-377. 1921.—Willow-herb (*Epilobium angustifolium*), a most valuable honey plant in Washington and Oregon, is also abundant on burned-over areas in the Sierra Nevada. Fiddle-neck (*Phacelia tanacetifolia*) and caterpillar phacelia (*P. hispida*) yield a white honey with pleasant aromatic flavor. One of the most important honey plants of California is vinegar weed or blue curls (*Trichostema lanceolatum*), which grows on dry plains and low hills throughout the Coast Ranges and the Sierra Nevada foothills. It blooms from August to November and is the source of a water-white honey of fine flavor, which granulates very quickly—in some cases before the cells are sealed. Horehound (*Marrubium vulgare*) yields a dark medicinal honey, which is a pest on a sage range as it darkens and spoils the sage honey.—J. H. Lovell.

3605. COWLES, H. C. Crop centers. [Rev. of: WALLER, A. E. Crop centers of the United States. Jour. Amer. Soc. Agron. 10: 49-83. 8 fig. 1918 (see Bot. Absts. 1, Entry 11).] Bot. Gaz. 69: 356. 1920.

3606. DADANT, C. P. More bee pasture. Amer. Bee Jour. 61: 431. 1921.—The rapid increase in the area planted with sweet clover is in many localities greatly increasing the amount of honey produced.—J. H. Lovell.

3607. DADANT, C. P. Sweet clover and lime in Illinois. Amer. Bee Jour. 61: 394. 1921.—Sand land along the Mississippi, Illinois, and Wabash rivers can be greatly improved by the use of lime and sweet clover.—J. H. Lovell.

3608. DEBOER, J. Beekeeping in foreign lands. Gleanings from Bee Culture 49: 626-627. 1921.—The author gives a list of the more important honey plants found in Mexico.—*J. H. Lovell.*

3609. GAAR, KARL. Verbesserung der Bienenweide. [Improving the bee forage.] Bienen-Vater 53: 129. 1921.—The importation of milkweed (*Asclepias dacia*) from America and Siberia and its general culture as a valuable addition to the honey flora are advised.—*M. G. Dadant.*

3610. GAAR, KARL. Verbesserung der Bienenweide. [Improving the honey flora.] Bienen-Vater 53: 129. 1921.—A plea is made for the more general cultivation of milkweed (*Asclepias*) in gardens and along railroad and other embankments. It is invaluable on account of its long blooming season.—*M. G. Dadant.*

3611. HASSLBAUER, A. M. Snow-on-the-mountain (*Euphorbia marginata*). Beekeeper's Item 5: 268. 1921.—Reports of a surplus from this plant have been received from eastern central, and southern Texas. The cup-like involucres have 5 white, petal-like appendages behind as many saucer-shaped nectaries.—*J. H. Lovell.*

3612. HASSLBAUER, A. M. Sumac as a honey plant. Beekeeper's Item 5: 236-237. Fig. 1. 1921.—Six species of sumac occur in Texas which are valuable as honey plants. Shawnee hair (*Rhus rhomboidea*) is common in the central and chaparral sections. It blooms from January to March and bees visit it in great numbers. Small-leaved sumac (*R. microphylla*), the most common species, grows in the hilly parts of the state. It blooms in March and again in the fall. Evergreen sumac or "kinnikinick" (*R. virens*), common on the Edwards Plateau and in the Trans-Pecos country, also blooms in March and again in the fall. The honey is dark amber and ill-flavored. Poison ivy (*R. radicans*) blooms from April to October. Common sumac (*R. copallina*) is distributed over a large part of the state, blooms in July and August, and yields a light amber honey of fair flavor. Smooth sumac (*R. glabra*) grows in eastern Texas, blooms in July, and yields a light amber honey of good flavor.—*J. H. Lovell.*

3613. HEIDEMA, T. Verband tusschen groeiplaatsen van Kievitsbloemen en grondsoort. [Relation between location of *Fritillaria Meleagris* and soil type.] Levende Natuur 26: 77-78. 1921.—*Fritillaria* prefers especially heavy clay soils; it never occurs in bogs. Observations were made near Haren, Paterswolde, and the western banks of Zwarte Water (Netherlands). The occurrence of this species may be of practical value in estimating soil types.—*J. C. Th. Uphof.*

3614. HERRICK, R. S. Bees and horticulture. Rept. State [Iowa] Apiarist 1919: 23-24. 1920.—Attention is called to bees as pollinating agents in orchards.—*L. H. Pammel.*

3615. HOHENHEIN, RENTSCHLER. Die Bienen als Blütenbefruchter. [Bees as pollinators of flowers.] Die Bienenfliege 43: 183. 1921.—Honeybees are far more valuable as pollinators of flowers than as producers of honey and wax.—*M. G. Dadant.*

3616. KLUMPAR, JOSEF. Interessante Beobachtungen über das Befliegen der Herbstzeiölöse. [Interesting observations on the bloom of the meadow saffron.] Bienen-Vater 53: 155. 1921.—Observations are reported on the visits of honeybees to the meadow saffron (*Colchicum autumnale*). Bees which visited the blossoms became intoxicated and in most instances were unable to return to the hives.—*M. G. Dadant.*

3617. LOVELL, J. H. Altitude and the secretion of nectar. Amer. Bee Jour. 61: 479-483. Fig. 1-7. 1921.—A discussion is presented of the effects of intense light and low temperature on the secretion of nectar at high altitudes and latitudes.—*J. H. Lovell.*

3618. MELANDER, A. L. First annual report of the Division of Apiculture to the Government of Washington State College of Washington. 119 p. 1921.—The author gives a preliminary list of the principal honey and pollen plants of Washington with brief descriptions of the more important species.—J. H. Lovell.

3619. MILLER, HUGH. Veronica or speedwell. Gleanings in Bee Culture 49: 566. 1921.—Near Kansas City, Missouri, during July, 1921, there were 4-5 acres of old pasture land purple with the bloom of *Veronica* or speedwell. Honeybees gathered nectar for an entire month from the flowers, which were in terminal spikes.—J. H. Lovell.

3620. OLIVER, F. W. *Spartina* problems. Ann. Appl. Biol. 7: 25-39. 1920.—The present article deals primarily with *Spartina Townsendii*, which is rapidly monopolizing the extensive tidal mud flats of the south coast of England. In addition to being a botanical problem of the first order, the amazing spread of *Spartina* is raising economic problems which must be met. This species made its appearance in Southampton waters in 1870. It is unknown in any other portion of the world, and is believed to have originated as a hybrid from *S. stricta* and *S. alterniflora*. Sea grass (*Zostera*), which was formerly the dominant type of vegetation in the soft mud flats, has been reported practically annihilated with the advent of *Spartina*. The appearance of such a vigorous plant with its great capacity for the accretion of mud and its promise of indefinite spread raises the vital question of its effect on navigation in the waters concerned. Attention is called to the necessity for studying this question. As an agent for reclamation it seems to have considerable promise. As a food for stock and as raw material for paper, investigations are not sufficient for definite conclusions but they seem to warrant further studies.—H. D. Barker.

3621. PADDOCK, F. B. Bees and horticulture. Rept. Iowa State Hort. Soc. 55: 124-129. 1920.—This is a discussion of the importance of bees and pollination in the orchard. The author gives the usual classification of pollinating agents,—wind, water, birds, etc.—L. H. Pammel.

3622. PAMMEL, L. H. A few honey plants of the rose family. Rept. State [Iowa] Apiarist 1919: 56-69. 1920.—The blooming period of *Prunus americana*, *Pyrus Malus*, and *P. ioensis* for different sections of the state of Iowa is reported. A description of methods of pollination for these species and *Prunus pennsylvanica* is given. The pollination is given only in so far as it applies to the honeybee—L. H. Pammel.

3623. PAMMEL, L. H. Some honey plants of Alabama. Amer. Bee Jour. 61: 360-361. 1921.—In the vicinity of Montgomery the chief honey plant is the biennial white sweet clover (*Melilotus alba*). The biennial yellow sweet clover (*M. officinalis*) and the small annual yellow sweet clover (*M. indica*) are also under cultivation, but the flowers of *M. indica* are only occasionally visited by bees. White clover is fairly common, and is visited frequently by honeybees. Several species of sumac are common on gravelly soils. Horsemint is abundant on clay soils and yields nectar well. Important nectar yielding trees in Alabama are the magnolias, white tupelo (*Nyssa aquatica*), and 2 species of basswood. The Cherokee rose (*Rosa laevis*) and the McCartney rose (*R. bracteata*), climbing everywhere, furnish an abundance of pollen.—J. H. Lovell.

3624. PARKS, H. B. Honey plant areas of Texas. Amer. Bee Jour. 61: 347-348. Fig. 1. 1921.—Notes are given on the principal regions for beekeeping in Texas and its nectar yielding flora. The state is so large that its flora comprises a great variety of plants. Northeastern Texas is largely covered by the western extension of the great pine and bardwood forest of the Gulf Coastal Plain. The chief components of this forest are long-leaf pine, short-leaf pine, loblolly pine, post oaks, and a variety of hardwood trees in the river bottomlands and swamps. Common honey plants are maple, basswood, white tupelo (*Nyssa aquatica*), persimmon, yaupon (*Ilex vomitoria*), rattan-vine (*Berchemia scandens*), red-bud, and a variety

of herbaceous plants.—The Rio Grande Plain, or Chaparral Region, is the commercial section for beekeeping. The flora is of Mexican origin, and according to Bray includes 70-80 species of small trees and shrubs absent in the Atlantic forests of east Texas. This region less than 100 years ago was largely grassland. Except in the river valleys there are no large trees, but vast areas are covered with a chaparral of low thorny bushes and small trees 2-15 feet tall. Thirty per cent of the species belong to the Leguminosae. Important honey plants are granjeno (*Momisia pallida*), agarita (*Berberis trifoliata*), Texas ebony (*Siderocarpus flexicaulis*), mesquite, *Leucaena*, retama (*Parkinsonia aculeata*), red bud, *Eysenhardtia*, colima (*Zanthoxylum pterota*), coma (*Bumelia lycioides*), huajilla (*Acacia Berlandieri*), catsclaw (*Acacia Greggii*), and white brush (*Aloysia ligustrina*).—West of the Coastal Plain lies the Black Prairie or Cotton Belt, the underlying rocks of which are Upper Cretaceous limestones. Throughout this area cotton is an excellent honey plant, and yields a mild-flavored white honey. Horsemint (*Monarda punctata*), marigold (*Gaillardia pulchella*), boncset, and smartweed are other valuable sources of honey.—Central Texas, west of the Black Prairie, is largely covered with mesquite (*Prosopis grandulosa*), which in favorable seasons yields a heavy flow of nectar. It is not probable that this section will ever produce honey in large quantities, as the rainfall is much less than on the Rio Grande Plain. Locally, catsclaw, white brush, and on the Edwards Plateau several species of sumac, yield a surplus of honey.—The Panhandle or Staked Plains, also called the West Plains, is a level country with few streams. The flora resembles that of western Kansas. There are no large trees, but shrubby mesquite and hackberry are found in the canyons and along the streams. There are very few bees in this section.—The eastern portion of the Trans-Pecos Region consists of broad level plains covered with sotol or beargrass, yucca, cactus, and agave; the western portion is broken by numerous short mountain ranges, surmounted with pine and mountain cedar, with intervening treeless valleys. Near El Paso and at Barstow there are large areas of irrigated alfalfa. Desert honey plants are mesquite, tornillo, and catsclaw.—*J. H. Lovell*.

3625. PARKS, H. B. The cotton plant as a source of nectar. *Amer. Bee Jour.* 61: 391-393. *Fig. 1-4.* 1921.—In southeastern U. S. A. cotton is usually a poor honey plant, but in Texas, parts of Oklahoma, Arkansas, and the Imperial Valley, California, it is the source of a large amount of honey. In Texas it is only in the Black Lands that cotton yields nectar copiously. A fertile soil containing a high percentage of lime and organic matter and a permanent supply of water are required. The floral involucral and leaf nectaries are described, and the water content of the nectar estimated.—While cotton blooms continuously from the middle of June until frost, there are 2 distinct blooming periods during which there are large nectar flows. During the 1st, when the plant is about 2 feet tall, the greater part of the cotton honey is stored. The 2nd period is in September or October, when cotton reaches "the flower garden stage," and the flow is occasionally very heavy.—According to the author's observations the cotton plant is highly self-fertile; and, as the pollen is only rarely collected by honeybees, he concludes that the latter are not important pollinating agents.—*J. H. Lovell*.

3626. PELLETT, F. C. Beekeeping in New York. *Amer. Bee Jour.* 61: 396-398. 1921.—There are few localities in the U. S. A. capable of supporting as many bees as the buckwheat region of New York. A few years ago there were 700 colonies at Delanson in one yard. Buckwheat yields nectar most freely when the nights are cool and the days clear and warm. But the larger part of the commercial honey crop in this state is secured from white and alsike clovers. Basswood is still important in a few places. The large orchards offer immense areas of bloom, but the colonies are seldom strong enough so early in the season to store much surplus from this source. At Prattville wild thyme (*Thymus serpyllum*) is a valuable honey plant, and 125 pounds of surplus honey per colony has been obtained from this plant. Purple loosestrife is common along the Hudson River and westward in part of the Mohawk Valley. It yields a dark-colored inferior honey. In the fall goldenrod and aster furnish winter stores.—*J. H. Lovell*.

3627. PELLETT, F. C. The false indigo. *Amer. Bee Jour.* 61: 445. 1921.—Five species of *Amorpha* are widely distributed in the U. S. A. but are not known to be important as honey plants except in Nebraska and Kansas. False indigo or river locust (*A. fruticosa*) yields an abundance of nectar and pollen.—J. H. Lovell.

3628. PHILLIPS, E. P. Veld burning experiments at Groenkloof—second report. Union of South Africa Dept. Agric. Sci. Bull. 17. 7 p., 7 fig., 2 diagr. 1921.—The objects of these experiments are to find out the effect of veld fires on the vegetation at different seasons of the year, to see to what extent the practice of burning is injurious or beneficial, and, if beneficial, the best season of the year at which to burn. Farmers assert that the health of their stock is affected by the veld burned at certain seasons of the year. Nothing is known as to the cause of this, and the experiments now being carried out may throw some light on the subject. At the same time investigations are being conducted as to the effect of overgrazing by sheep and cattle on the vegetation.—In December, 1919, 9 oxen were placed in a camp 2 morgen in extent and 30 sheep in a camp of the same size. The oxen soon completely grazed down the grass; the sheep camp was not grazed down to nearly the same extent. The observations during the year point to the fact that the later the veld is burned the greater the number of shrubs in the resulting vegetation. The plots burned during May to the beginning of July were typical grass veld at the end of January the following year. Plots burned from the beginning of September to the end of November resulted in the grasses being very backward at the end of January, or shrubs, especially *Vigna angustifolia*, may dominate. Another interesting point noted was the dominant nature of *Elephantorrhiza Burchellii* in the early burns; this gradually decreased in the later burns and *Vigna angustifolia* became dominant instead.—E. P. Phillips.

3629. PROTHERO, JOHN. Deceptive honey flora. *Amer. Bee Jour.* 61: 400. 1921.

3630. ROOT, A. I. The Hubam clover. *Gleanings from Bee Culture* 49: 444-446. Fig. 1. 1921.—A report is given on the new annual variety of the biennial white sweet clover.—J. H. Lovell.

3631. ROOT, E. R. The Hubam sweet clover. *Gleanings from Bee Culture* 49: 551-554. Fig. 1-8. 1921.—The new annual white sweet clover is cultivated extensively in the Black Belt of Alabama. It is not only a valuable fodder plant but also yields abundant nectar. The quality of the honey is similar to that of the biennial species.—J. H. Lovell.

3632. SHAFER, GEO. B. The honeybee and color vision. *Amer. Bee Jour.* 61: 443-445. 1921.—A résumé is presented of the experiments of Frisch and Hess on the color vision of honeybees.—J. H. Lovell.

3633. SKLENAR, GUIDO. *Asclepias carnosa*. *Bienen-Vater* 53: 129. 1921.—A description is given of the pollen of milkweed, which often entraps honeybees when on the flowers in search of nectar.—M. G. Dadant.

3634. TSCHUDIN, E. Pollen in bees' diet. *Gleanings from Bee Culture* 49: 759-760. 1921.

3635. WIEGAND, K. M. Protection of nectar. *Gleanings from Bee Culture* 49: 487-489. Fig. 1-2. 1921.—The author describes various ways and special contrivances by which nectar is protected from rain and undesirable guests.—J. H. Lovell.

3636. WILBRAND. Der Götterbaum als Honigquelle. [The Tree of Heaven as a honey source.] *Leipziger Bienenzeitg.* 36: 145-146. 1921.—A description is given of *Ailanthus glandulosa* as a producer of honey, with some limitations affecting its yield of nectar.—M. G. Dadant.

3637. WILDER, J. J. Black gum as a honey plant. *Dixie Beekeeper* 5*: 8-9. 1921.

3638. WILDER, J. J. Cotton as a honey plant. *Dixie Beekeeper* 5⁴: 13-14. 1921.
3639. WILDER, J. J. Goldenrod as a honey plant. *Dixie Beekeeper* 5⁴: 18-19. 1921.
3640. WILDER, J. J. Huckleberry. *Dixie Beekeeper* 5⁴: 9-10. 1921.—The huckleberries are abundant in Georgia and yield a beautiful pink colored, thin honey which has a pronounced flavor. It is seldom obtained pure and commercially is not important.—J. H. Lovell.
3641. WILDER, J. J. Partridge pea as a honey plant. *Dixie Beekeeper* 5⁴: 5-7. 1921.—The flowers of the partridge pea are nectarless and are pollinated by bumblebees. The nectar is secreted by glands on the upper side near the base of the leaf-stems. It contains a high percentage of water, and the honey requires a long time to ripen. An average of about 60 pounds per colony is obtained from this plant. The honey is light amber-colored with medium body, and a mild agreeable flavor.—Partridge pea grows well on a high, thin, sandy soil from which grain has been harvested. It yields nectar most heavily in the sand-ridge section of the central part of Florida, a belt of high sandy soil extending from the north border line to Dade City.—J. H. Lovell.
3642. WILDER, J. J. Snowvine as a honey plant. *Dixie Beekeeper* 5⁴: 11-12. 1921.—Snowvine or pepper-vine (*Cissus arborea*) grows in damp rich soil along rivers and small streams throughout the southern [U. S. A.] states. It blooms in July and August and yields a dark amber honey with a fine flavor. It is not unusual to obtain an average surplus of 50 pounds per colony.—J. H. Lovell.
3643. WILDER, J. J. Spring titi as a honey plant. *Dixie Beekeeper* 5⁴: 4. 1921.—Spring titi (*Cliftonia monophylla*) in very wet land throughout a large part of the Coastal Plain grows in dense thickets called "titi swamps." It is a valuable commercial honey plant, yielding a large surplus of light amber honey with a strong flavor. The honey granulates quickly when extracted. But for this plant, many thousand colonies of bees would perish or be greatly depleted.—J. H. Lovell.
3644. WILDER, J. J. Summer titi as a honey plant. *Dixie Beekeeper* 5⁴: 6-7. *Fig. 1-2*. 1921.—The blooming of summer titi (*Cyrtilla racemiflora*) closes the spring honey flow in Georgia. It yields nectar sparingly, and it is seldom that even a strong colony stores more than 50 pounds of honey. The honey is light amber and has a mild rich flavor.—J. H. Lovell.
3645. WILDER, J. J. The aster as a honey plant. *Dixie Beekeeper* 5⁴: 9-11. 1921.
3646. WILDER, J. J. The great peach section. *Dixie Beekeeper* 5⁴: 6-7. 1921.—The great peach orchards of Georgia bloom so early, while frost and cold winds are still common, that they do not yield a surplus of honey.—J. H. Lovell.
3647. WEST. Irrtümer unserer Bienennährpflanzen. [Errors in our honey-producing plants.] *Deutsch. Illus. Bienenzeitg.* 38: 86-88. 1921.—The author discusses the value, as honey-producers, of plants with inconspicuous and green blossoms. These are generally regarded as unattractive to bees, but many are good honey plants.—M. G. Dadant.
3648. YANCEY, J. D. Midsummer nectar. *Gleanings from Bee Culture* 49: 695. 1921.—At Bay City, Texas, horsemint (*Monarda punctata*), purple thistle (*Eryngium Leavenworthii*), and cotton yield a large amount of nectar during the extremely hot, dry summer weather.—J. H. Lovell.
3649. ZAISS. Die einjährige Riesenhonig (Hubam)—Klee. [The great annual honey plant, Hubam clover.] *Neues Schlesiendes Imkerblatt* 20: 183. 1921.—A report is given on the great results obtained in America with the newly discovered Hubam clover with special reference to its honey-producing qualities and its production of humus during a short period of growth.—M. G. Dadant.

MISCELLANEOUS

3650. ANONYMOUS. Alpine plants on Snowdon. *Kew Bull.* 1921: 319-320. 1921.—Notes are given on the establishment of a garden for the cultivation of alpine plants.—*E. Mead Wilcox.*
3651. ANONYMOUS. Biological exploration of the Amazon basin. *Brooklyn Bot. Gard. Rec.* 10: 97. 1921.—The Mulford Expedition, comprising H. H. Rusby, director, Orland E. White, botanist, Frederick L. Hoffman, anthropologist, William M. Mann, entomologist, Everett Pearson, ichthyologist, George S. McCarty, stenographer and taxidermist, and Gordon McCreaigh and Mr. Owen Cattell, photographers, sailed June 1, 1921, for the biological exploration of the Amazon basin. The route is eastward from LaPaz, crossing the Andes at an elevation of over 19,000 feet.—*C. S. Geyer.*
3652. AHRENS. Mittheilungen über den Naturschutz in den Vereinigten Staaten. [Conservation in the United States.] *Beiträge Nat. Denkmalspflege* 9: 56-109. 1919.—The paper gives a brief account of the history of national parks beginning with the Yellowstone in 1872. In 1915 there were 14 national parks. Attention is called to the establishment of a national park service in 1916. A general account of the rules and regulations of the national park service is given. There follows a discussion of the purpose of the Ecological Society of America, which will endeavor to make a biological study of the national and state parks. The paper contains a brief description of the national parks and monuments. There is also a description of state parks, mention being made of the work in Iowa, South Dakota, Maryland, Illinois, New York, Colorado, and in Canada.—*L. H. Pammel.*
3653. BUTLER, ALBERT E. Notes by a collector in the Colorado Rockies. *Nat. Hist.* 19: 170-181. *Pl. 12.* 1919.—This paper consists of 12, for the most part full page, half-tones from the author's photographs of trees and flowers; running notes accompany the plates.—*Albert R. Sweetser.*
3654. CARR, C. E. M. The Backbone. *Rept. Iowa State Bd. Conservation* 1919: 48-50. 1920.—This paper describes the stone cliffs and plants.—*L. H. Pammel.*
3655. COMPTON, R. H. The Karroo Garden at Whitehills. *Jour. Bot. Soc. South Africa* 7: 11-12. 1921.
3656. EDWARDS, GWENDOLEN. The Rhodéan reserve for native South African plants. *Jour. Bot. Soc. South Africa* 7: 17-18. 1921.
3657. FOX, HENRY. Two Orthoptera new to New Jersey, with comments on their local habits. *Entomol. News* 32: 264-270. 1921.—Notes are given on 2 species of grasshoppers and their plant associations.—*O. A. Stevens.*
3658. HAYDEN, ADA. Conservation of prairie. *Rept. Iowa State Bd. Conservation* 1919: 283-284. 1920.—Agriculture has banished the prairie and caused the disappearance of wild flowers. A bit of prairie land should be preserved before it is too late.—*L. H. Pammel.*
3659. LEES, JAMES H. Some ecological aspects of conservation. *Rept. Iowa State Bd. Conservation* 1919: 270-276. 1920.
3660. LEES, JAMES H. The Palisades should be a state park. *Rept. Iowa State Bd. Conservation* 1919: 94-95. 1920.—This is a running account of the geology and the plants; cedars are found on the homogeneous escarpment of limestone rock.—*L. H. Pammel.*
3661. MILLS, ENOS A. The wars of the wind at timber-line. *Nat. Hist.* 19: 427-435. *10 illus.* 1919.—A popular description is given of the struggle of the tree for existence in the Rocky Mountains against wind and snow, moving stones, and fire.—*Albert R. Sweetser.*

3662. MOGG, A. O. D. A method of veld determination. South African Jour. Sci. 17: 222-226. 1921.

3663. PAMMEL, L. H. Report of the Backbone area. Rept. Iowa State Bd. Conservation 1919: 41-42. 1920.—This is a short account of the geology and plants of the Backbone Park in Delaware County.—*L. H. Pammel.*

3664. PORTAL, M. Abraham's oak. Kew Bull. 1920: 257-258. 1 pl. 1920.—This article gives ecological notes on *Quercus calliprinos* in Palestine.—*E. Mead Wilcox.*

3665. SCHONLAND, S. A trip to the Knysna. Kew Bull. 1920: 225-231. 1920.

3666. SEWARO, A. C. The Danish Arctic station. Nature 108: 320-321. 2 fig. 1921.—The station at Godhavn, on the south coast of Disco Island off the west coast of Greenland (69°14' N.), is described. This is the "only station in the world north of the Arctic Circle where it is possible under very favorable conditions and with adequate facilities to carry out experimental scientific investigations." The Godhavn district has an exceptionally rich and varied flora.—*O. A. Stevens.*

3667. SHIMEK, B. Conservation of natural scenery in Iowa. Rept. Iowa State Bd. Conservation 1919: 276-279. 1920.—The author discusses erosion along streams and the conservation of timber, lakes, and streams for the maintenance of moisture. He urges the conservation of plants and animals for the study of natural conditions for scientific purposes.—*L. H. Pammel.*

3668. SMALL, JOHN K. A botanical excursion to the Big Cypress. Nat. Hist. 20: 468-500. Pl. 8. 1920.—A preliminary survey is reported of the Big Cypress Swamp, between the Everglades and the Gulf of Mexico. The writer accompanied W. Stanley Hanson, of the U. S. Biological Survey, through this region, making notes, collections, and photographs. Little is known concerning the natural history of the region. Difficulties of the trip and the nature of the country traversed are described.—*Albert R. Sweetser.*

3669. SOFER, E. K., and C. C. OSBON. Peat in Michigan. Jour. Amer. Peat Soc. 14: 8-16. 1921.—The peat deposits of Michigan consist largely of "muskegs" and grass-sedge marshes in basins of glacial origin and are similar in most respects to those of Minnesota and Wisconsin. It is estimated that 80 per cent of the peat of Michigan is in the northern peninsula.—*G. B. Rigg.*

3670. SPURRELL, J. A. The disappearance of native plants in Iowa. Rept. Iowa State Bd. Conservation 1919: 235-237. 1920.—Such plants as *Anemone patens* (var. *Wolfgangiana*), *Gentiana Andrewsii*, *G. puberula*, *Cypripedium candidum*, *Lilium philadelphicum*, *L. superbum*, *Nymphaea tuberosa*, *Calla palustris*, need protection in Iowa.—*L. H. Pammel.*

3671. WEISS, H. B., and E. WEST. Additional notes on fungous insects. Proc. Biol. Soc. Washington [D. C.] 34: 167-172. Pl. 1. 1921.—Additions are made to lists previously published.—*J. C. Gilman.*

3672. WHITE, J. W. Notes on Bristol plants. Jour. Botany 59: 299. 1921.—Ecological notes on *Salicornia dolichostachya*, *Glyceria maritima*, *Spartina Townsendi*, *Limosella aquatica*, and *Cyperus fuscus* are given.—*S. H. Burnham.*

3673. WOLFE, J. J. The plankton of the Chesapeake Bay. Jour. Elisha Mitchell Sci. Soc. 36: 3-4. 1920.—The results are summarized under 7 headings, of which the last is: "Neither 'count' nor 'volume' gives an absolutely true indication of food available. These two in connection with 'incineration' would probably give a more correct idea."—*W. C. Coker.*

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 3425, 3460, 3501, 3504, 3511, 3514, 3597, 3946, 4035, 4074, 4088, 4191, 4202, 4306, 4325, 4361, 4473, 4502, 4584, 4745, 4784, 4790, 4853, 4854, 4878)

3674. ANONYMOUS. Allgemeine Wirtschaftsgrundsätze der Württembergischen Staatsforstverwaltung. [General principles for management of Wurttemberg state forests.] Deutsch. Forstzeitg. 36: 916-917. 1921.—Production must be on a sustained yield basis; the maintenance and improvement of forest soil must be given first consideration; the growing of mixed stands is to be encouraged; natural reproduction is to be the rule, using artificial reforestation only where natural reproduction does not succeed, and then using only home grown seeds and plants, or those of favorable origin. The fullest possible advantage must be taken of thinnings, and the practice of making large and continuous cuttings must give way to that of scattering the cut widely in small units.—W. N. Sparhawk.

3675. ANONYMOUS. Conseil supérieur des forêts. [The superior forest council.] Bull. Soc. Centrale Forest. Belgique 24: 225-239. 1921.—The discussion of the recent law in its application to forest properties is given. The differences between the sale of forest products as revenue and as the liquidation of capital are pointed out. The distinction rests upon whether the forest is managed for continuous revenue or is disposed of as real estate. It is an interesting commentary on forest and other classes of property.—W. C. Lowdermilk.

3676. ANONYMOUS. Die Agrarreform und die grossen Waldbesitze in Jugoslawien. [Agrarian reform and large forest estates in Jugoslavia.] Wien. Allg. Forst u. Jagd Zeitg. 40: 33-34. 1922. [Translation from Jugoslovenska Suma.]—Official orders and laws passed since February, 1919, are cited with explanatory comment. The object of these laws is to maintain forest estates except where the land is suitable and needed for agricultural colonization. Cutting is not allowed to exceed the prescribed annual felling budget (annual growth). Title is left in the hands of the owner but strict state supervision is exercised and in cases of non-compliance the estates may be expropriated.—F. S. Baker.

3677. ANONYMOUS. Effect of pruning green branches from larch. Trans. Roy. Scottish Arbor. Soc. 35: 79. 1921.—A widely spaced larch plantation was pruned when 25-35 years old. The branches were large. After pruning many of the trees bled, and for 6 or 7 years following growth was not so rapid as it had been. When felled 60 to 70 years later, many of the trees proved to be badly decayed. Unpruned trees were quite sound in every case.—C. R. Tillotson.

3678. ANONYMOUS. Excursion forestière. [A forest excursion.] Bull. Soc. Centrale Forest. Belgique 24: 271-274. 1921.

3679. ANONYMOUS. Forest fire laws and regulations—1921. 87 p. California State Bd. Forest.: Sacramento, 1922.—A synopsis and codification of all California laws which deal with forestry are presented. Fire fighting rules are briefed.—Woodbridge Metcalf.

3680. ANONYMOUS. Gifford Pinchot on the Snell bill. Amer. Forest. 28: 244-245. 1922. —Testimony before the Agricultural Committee of [U. S. A.] Congress is presented.—Chas. H. Otis.

3681. ANONYMOUS. L'impôt forestier au Sénat. [Consideration of the forest tax law in the Senate.] Bull. Soc. Centrale Forest. Belgique 24: 283-288. 1921.—A discussion is given of the injustices arising out of the new forest taxation.—W. C. Lowdermilk.

3682. ANONYMOUS. Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts. [A law provisionally authorizing the government to prevent the excessive cutting in certain woods and forests.] Bull. Soc. Centrale Forest. Belgique 24: 239-256. 1921.—Gives full discussion of law by the Chamber of Representatives. It was designed to check the free play of the economic demand to the detriment of general benefits of the forests to the nation. The 2 sides of the conflict are clearly brought out in the discussion.—*W. C. Lowdermilk*.

3683. ANONYMOUS. Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts. Suite. [A law provisionally authorizing the government to prevent the excessive cutting in certain woods and forests.] Bull. Soc. Centrale. Forest. Belgique 24: 298-311. 1921.—The record of the discussion of this law by the Chamber of Representatives is given. It was designed to check the free play of economic demands to the detriment of public benefits. The 2 sides of the issue are presented.—*W. C. Lowdermilk*.

3684. ANONYMOUS. Research and education in the Geddes report. Nature 109: 197-199. 1922.—A vigorous protest is made against the attitude of the Committee on National Expenditure toward education and research in making a supercut of £18,000,000. "The activities of the Forestry Commission are threatened with extinction by the report which recommends that the scheme of afforestation by the State shall be discontinued."—*O. A. Sterens*.

3685. ANONYMOUS. The forest resources in India. [Abstract from: The work of the Forest Department in India. 54 p., 17 pl. Harrison and Sons: London, 1920.] Nature 105: 729-732. 3 fig. 1921.

3686. ANONYMOUS. The southern beech (*Nothofagus*) forests of New Zealand. New Zealand Jour. Agric. 23: 353-360. 3 fig. 1921.—Confined largely to areas which could not be converted into grasslands, these forests regenerate rapidly and yield a good supply of commercial timber.—*N. J. Giddings*.

3687. ANONYMOUS. Übersicht des Flächeninhaltes und des Holzertrages der Staatsforsten. [Areas and yields of Prussian state forests.] Deutsch. Forstzeitg. 36: 780. 1921.—The areas and yields of timber for the fiscal year 1921 are given for each of the 32 state forests. From the total area of 2,442,576 hectares 9,486,111 cubic m. of wood were to be cut.—*W. N. Sparhawk*.

3688. ANONYMOUS. Versuche über die Entstehung von Waldbränden. [Experiments on origin of forest fires.] Deutsch. Forstzeitg. 36: 798-799. 1921.—Several foresters contradict the statements made by Reinhardt in an article under this title in a recent issue of the Deutsche Forstzeitung.—*W. N. Sparhawk*.

3689. ANONYMOUS. Zur Forststatistik in Slowenien. [Forest statistics in Jugo-Slavia.] Wien. Allg. Forst. u. Jagd Zeitg. 39: 237. 1921.—Forest statistics for all the states which make up the Kingdom of the Serbs, Croats, and Slovenes are available for 1920. The forest area amounts to 42.5 per cent of the total area of the kingdom. Of this area 3.11 per cent are forests under state control, 5.83 per cent are communal forests while 91.06 per cent are privately owned. Forest holdings in excess of 50 hectares are in the hands of 579 owners, who control 29 per cent of the forested area, the remaining 71 per cent are in the hands of the thousands of small owners. The forests are 39 per cent coniferous, 33 per cent broadleaf, and 28 per cent mixed. Fifty-four per cent of the area is managed on the selection system with almost 41 per cent on the clean cutting system, 3 per cent coppice, and 2 per cent coppice with standards.—*F. S. Baker*.

3690. ANONYMOUS. Zur Holzproduktion Italiens. [The wood production of Italy.] Wien. Allg. Forst u. Jagd Zeitg. 39: 161-162. 1921.—Even before the war only 15.9 per cent of Italy was forested. During the war cutting was heavy, and great destruction occurred in the Alpine portion of northeastern Italy. It is doubtful whether successful replanting can be done on these devastated areas except at prohibitive costs. Forest devastation is common all over Italy, as well as on the island of Sardinia. The Italian Tourist Club is striving to awaken public opinion, and improvement is expected in the near future. Austria is at present exporting considerable lumber to Italy.—F. S. Baker.

3691. A. Die Aufforstung von Grundstücken. [The afforestation of agricultural land.] Deutsch. Forstzeitg. 36: 898. 1921.—A proposed Bavarian law would restrict the afforestation of land used for agriculture. From 1903 to 1912, 11,998 hectares of such land were afforested, of which 4,288 were good agricultural land, the rest comparatively inferior. More than half of the total was the work of peasant owners of small tracts. The withdrawal of this land from agriculture is deemed contrary to the public interest.—W. N. Sparkhawk.

3692. ANDERSON, H. M. Survey of the township of Owens, in District of Timiskaming. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 82-84. 1919.—Fully 90 per cent of this township is suitable for farming as the land is well drained and tillable, the soil being a loose-textured clay loam. The timber is almost entirely spruce with some large poplar on the uplands. Along the streams there are large white spruce while the remainder of the timber is suitable for pulpwood.—A. W. McCallum.

3693. ANDERSON, M. L. Branch growth of Douglas fir. Trans. Roy. Scottish Arbor. Soc. 35: 144-147. 1921.—Measurements show an annual branch growth of 6 inches in length and $\frac{1}{8}$ inch in diameter in one plantation and 15 inches in length and $\frac{1}{4}$ inch in diameter in the other. The spacing of trees in the former was $4\frac{1}{2} \times 4\frac{1}{2}$ feet, in the latter $3\frac{1}{2} \times 3\frac{1}{2}$ feet. Despite a closer planting distance, the branch growth is stronger in the latter plantation. The rate of branch growth is more dependent upon the quality of the site than upon planting distance.—C. R. Tillotson.

3694. ANDERSON, MARK L. On planting distances for conifers. Trans. Roy. Scottish Arbor. Soc. 35: 16-25. 1921.—The author discusses the silvicultural and financial aspects of close versus wide spacing in forest plantations.—C. R. Tillotson.

3695. APPEL, CONRAD. Vorläufige Erntebericht der Forstsaamen. Werke Conrad Appel, Darmstadt. [Predictions regarding crops of forest seeds.] Forstwiss. Centralhl. 43: 440. 1921.

3696. BADOUX, H. Le pin Weymouth (*Pinus Strobus*) en Suisse (suite). [The Weymouth pine (*Pinus Strobus*) in Switzerland (continued).] Jour. Forest. Suisse 72: 148-152. 1921.—The article describes numerous plantations of *Pinus Strobus* in Switzerland, gives their age, number of trees, the range in diameters and heights, and the production in cubic m. Comparisons are made with the native species, generally to their disadvantage. The sale value and uses are given.—W. C. Lowdermilk.

3697. BADOUX, H. Le pin Weymouth (*Pinus Strobus*) en Suisse (suite et fin). [The Weymouth pine (*Pinus Strobus*) in Switzerland (concluded).] Jour. Forest. Suisse 72: 165-173. 1921.—This installment deals with the enemies of *Pinus Strobus*, the most dangerous being blister rust (*Cronartium ribicola* Dietr.) Originating in Europe, the disease spread until it was necessary generally to stop the planting of this tree. In 1904, the disease appeared in Switzerland and has since extended over the entire country. Remedies are specified for the disease. Control investigations were conducted in the Arboretum de Groenendaal near Brussels. A 10 per cent solution of potassium permanganate proved most effective in curing affected trees. *Agaricus melleus* Wahl and *Trametes radiciperda* R. Hartig are other fungal diseases of the pine.

Pinus Strobus is well suited to the level country despite the blister rust attacks. Its growth is superior to the indigenous species, it reproduces naturally, and its wood is highly valued. It is recommended for high forests.—*W. C. Lowdermilk*.

3698. BARBEY, A. Un incendie forestier dans l'Esterel. [A forest fire in l'Esterel.] Jour. Forest. Suisse 72: 141-148. 2 pl. 1921.—The disastrous forest fire which started July 26, 1918, occasioned the study of the causes of fires, of the rapid spread, and of the type of damage done in the dry coastal region of the Mediterranean Sea. The most common cause is the carelessness of smokers and other pedestrians in the forest. Incendiarism is uncommon. The scarcity of rainfall, the type of ground cover, both dead and living, particularly the action of the dry hot wind (the Mistral), broken pieces of glass bottles acting as lenses, lightning, and, quite rarely, meteorites are responsible for fire. The spread of fire is favored by the dense growth of underbrush under the maritime pine, and cork oak stands aid the rapid progress of fires. Fire lanes (10-50 m. wide) are useless under these circumstances. The action of the hot wind (Mistral) may be sufficient to make human efforts at suppression ineffective. The best measure against conflagrations is to maintain an even forest cover by means of selection cutting.—*W. C. Lowdermilk*.

3699. BATES, CARLOS G., and ALFRED J. HENNY. Streamflow experiment at Wagon Wheel Gap, Colorado. Monthly Weather Rev. Suppl. 17. 55 p., frontispiece, fig. 1-41. 1922.—The preliminary report on the termination of the first stage of the experiment on the effect of forests on streamflow gives an analysis of the climatic and streamflow data obtained. Two areas of nearly the same size, location and topography, have been observed for 8 years. One of the areas is now to be denuded. It has been found possible to calculate the discharge of the area to be denuded from the data obtained on the area to be kept covered. The analysis of the streamflow is made on a basis of the effect of cover conditions, precipitation, snow cover, and temperature.—*E. N. Munnis*.

3700. BEATTY, DAVID. Re-survey of the township of O'Brien, District of Algoma. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 81-82. 1919.—From the point of view of agriculture this is one of the best townships in northern Ontario. All the large timber has been taken out for railroad construction work, but in the northern and southern portions there is timber suitable for pulpwood.—*A. W. McCallum*.

3701. BEATTY, DAVID. Survey of the township of Williamson, in the District of Algoma. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 78-79. 1920.—About 6 per cent of this township has been burned over but the remainder is well timbered. About half the area is covered with spruce swamp with deep moss, the timber being 4-7 inches in diameter. The remainder of the township is wooded with spruce, poplar, balsam, and white birch 4-12 inches in diameter.—The soil is clay for the most part, about 50 per cent of the area being covered with moss from 6 inches to 2 feet in depth.—*A. W. McCallum*.

3702. BEATTY, HERBERT J. Survey of certain township outlines in the District of Timiskaming. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 62-65. 1920.—The timber is chiefly spruce of pulpwood size with scattered stands of jack pine and poplar. A considerable portion of this area has been burned over, some of it during the present season.—About half of the soil is clay suitable for agriculture while the remainder is sandy.—*A. W. McCallum*.

3703. BEATTY, HERBERT J. Survey of the township outlines on the south side of upper Abitibi Lake, in the District of Timiskaming. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 84-86. 1919.—This area is chiefly valuable for its spruce timber, and there is not sufficient arable land to warrant development along agricultural lines.—*A. W. McCallum*.

3704. BELL, J. P. F. The advantages of shelter belts. Trans. Roy. Scottish Arbor. Soc. 35: 106-111. 1921.—The advantages of shelter belts to livestock, methods of formation, choice of species, cost, etc., are discussed.—C. R. Tillotson.

3705. BENNETT, W. H. The economical production of commercial timber crops. Quart. Jour. Forest. 15: 252-261. 1921.—A discussion, with figures, is presented of initial and final costs of plantations and the spacings to which European larch, Douglas fir, Corsican pine, Scotch pine, Norway spruce, and Sitka spruce seem adapted.—C. R. Tillotson.

3706. BINGHAM, E. R. Survey of hase and meridian lines in the District of Thunder Bay. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 70-72. 1920.—The whole area has been logged at a comparatively recent date and most of it has been burned over. There is practically no timber of commercial value left, the principal trees being small birch and poplar.—The greater part of the land is rocky, sometime bare but usually with a shallow covering of leafy loam. There are some agricultural areas in which the soil is either a white to light brown clay or a clay loam.—A. W. McCallum.

3707. BLAIN, R. J. Pulp storage in water. [Abstract.] Phytopathology 12: 60. 1922.

3708. BRUCE, DONALD. The relative cost of making logs from small and large timber. California Agric. Exp. Sta. Bull. 339. 317-333. 1922.—It costs 3 times as much per M. B. M. to make logs from 18 inch as from 48 inch trees. Below 18 inch diameter the costs rise rapidly with each further decrease in size.—A. R. C. Haas.

3709. CAVANA and WATSON. Survey of township outlines in the District of Sudbury. Ann. Rept. Minister Lands, Forests and Mines, Ontario, 1919: 92-94. 1920.—In isolated areas there are stands of heavy timber, chiefly jack pine. The tree growth is generally small. This condition may possibly be due to a hard, impenetrable subsoil which makes the trees very liable to wind throw after they have reached a height of 20-30 feet. A small block of red and white pine was observed.—A. W. McCallum.

3710. CODE, T. G. Traverse survey of the Opazatika River and Lakes, Pishkanogama Lake, Ground Hog and Horwood Lake and Sahkatawichtah River and Lake. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 87-91. 1920.—The shores of these rivers and lakes are fairly well timbered with jack pine, spruce, balsam, poplar, and birch. There are also some large burned areas. On the banks of the Ground Hog River there was a good deal of ash up to 10 inches in diameter. On the shores of Horwood Lake some red pine was seen.—A. W. McCallum.

3711. CROUCH, M. E. Survey of the outlines of the Pic River pulpwood and timber limit, District of Thunder Bay. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 84-86. 1920.—The prevailing timber in this area is spruce, balsam, birch, and poplar, though none seen was of commercial importance. No white or red pine was seen. Only a small amount of jack pine was observed. The land is generally rocky with small intervening areas of clay or sandy soil.—A. W. McCallum.

3712. CUNLIFFE, N. The Douglas fir aphid. Quart. Jour. Forest 15: 157-159. 1921.—The life history of this insect (*Chermes cooleyi* Gill.) as it is known in England and Scotland is discussed. A method of control is given.—C. R. Tillotson.

3713. DACY, G. H. Lessening lumber losses. Some of the ways in which wood wastes are saved and put to work. Sci. Amer. 126: 42-43. 4 fig. 1922.

3714. DENHAM, H. J. A note on the fall of winged seed. Quart. Jour. Forest. 15: 247-252. 1921.—Many problems of regeneration hinge on the distance to which forest tree seed may be

carried by the wind. Experiments, admittedly incomplete, conducted to determine the rate of fall of 18 species of tree seed indicate velocities varying from 0.7 to 1.48 m. per second. Assuming that Scotch pine seed, which falls at an average rate of 0.72 m. per second, is dispersed from a cone 20 m. above the ground, it will take it 27 seconds to reach the earth. If propelled laterally at the same time by a steady wind of 25 km. per hour, it will travel to a point at ground level 187.5 m. distant. Upward currents of air, moreover, may even serve to carry seed over ridges from one valley to another.—*C. R. Tillotson.*

3715. DOBIE, JAMES S. Survey of the township of Idington, in the District of Algoma. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 86-89. 1919.—At present this area is well timbered with spruce and balsam on the low ground and with poplar and birch on the higher land. The spruce is of excellent quality for pulpwood.—*A. W. McCallum.*

3716. DRUMAU, L. Les grandes plantations de résinaux et leur risques. [The large plantations of conifers and their risks.] Bull. Soc. Centrale Forest. Belgique 24: 283-291. 1921.—Extensive even-aged plantations of conifers are subject to destruction by fire and to excessive damage by insects. Uneven aged stands of conifers intermixed with broad-leaved species are recommended.—*W. C. Lowdermilk.*

3717. EL, P. Die Bewaldungsverhältnisse der Mittelmeerländer. [The forests of the Mediterranean region.] Wien. Allg. Forst u. Jagd Zeitg. 39: 209-211, 215-216, 221-222. 1921.—A popular description is presented of the forests of southern Spain and France, Italy, Greece, western Asia Minor, Palestine, and the north African coast lands. A general description of topographic and climatic features is given, also the altitudinal sequence of forest types, chief species, and their relations. The status of forestry in each country and the chief features of the lumber trade are discussed. The wide distribution of the Mediterranean evergreen chaparral type is stressed and the essential similarity of other types in many lands is recognized.—*F. S. Baker.*

3718. EBERHARD, J. Begriffliches: Dauerwald-Blendersaumschlag. [The meaning of Dauerwald and Blendersaumschlag.] Forstwiss. Centralbl. 43: 441-448. 1921.—The writer discusses Wagner's criticism of Fabricius' statement that "Plenterwald" and "Dauerwald" are the same thing, and also that "Blendersaumschlag" and "Saumfemelschlag" are identical. He points out that there are 2 distinct forms of selection cutting, one (Blenderschlag) taking only mature trees, the other (Femelschlag) cutting in all age classes. Dauerwald is not necessarily selection forest, according to Wagner. The so-called selection cutting of the Blendersaumschlag is more like a shelterwood cutting. [See also Bot. Absts. 11, Entry 3721].—*W. N. Sparhawk.*

3719. ESCHENLOHR, HANS. Die Anfänge einer geordneten Forstwirtschaft im Hoheitsgebiet der freien Reichstadt Memmingen. [Beginnings of forestry in Memmingen.] Forstwiss. Centralbl. 43: 297-319. 1921.—An account is given of the methods of forest management and silviculture introduced in the forests under the control of the free city of Memmingen (Swabia) by Michael Schwegelin, who had charge of them from 1540 to 1583. It is also told how since the middle of the 13th century conifers (chiefly *Picea excelsa*) have been encroaching on the hardwood areas (chiefly beech and oak) in spite of measures taken to prevent it.—*W. N. Sparhawk.*

3720. FABRICIUS. Neuzeitliche Forstwirtschaft. [Present day forestry.] Wien. Allg. Forst u. Jagd. Zeitg. 39: 173-174. 1921.—A controversial discussion of an earlier article by Kubelka [see Bot. Absts. 10, Entry 1018].—*F. S. Baker.*

3721. FABRICIUS. Zur Abwehr. [In self defense.] Forstwiss. Centralbl. 43: 401-412. 1921.—This is a reply to Christoph Wagner's criticism of Fabricius' statement that "Dauerwald" is the same thing as "Plenterwald," and that the "Blendersaumschlag" of Wagner is

only another name for the old "Saumfemelschlag." In support of this assertion Fabricius lists the different silvicultural systems under 3 main heads—clear cutting, shelterwood cutting, and selection cutting—and the several variations in system under each. He says that Wagner's system is not one to be used generally, because it means a reduction in annual increment and a greater capital outlay, besides being unnecessary to secure satisfactory reproduction. [See also Bot. Absts. 11, Entry 3718.]—*W. N. Sparhawk.*

3722. FREUDENBERG, K., und H. WALPUSKI. Der Gerbstoff der Edelkastanie 8. Mitteilung über Gerbstoffe und ähnliche Verbindungen. [The tannin of the true chestnut 8. Contributions concerning tannins and similar compounds.] Ber. Deutsch. Chem. Ges. 54: 1695-1700. 1921.—The tannin found in the leaves, wood, and bark of the true chestnut (*Castanea vesca*) is the same. The crude tannin is a mixture which upon hydrolysis yields quercetin, traces of gallic acid, about 2 per cent sugar (mainly glucose), and traces of non-aromatic oxy-acids.—*Henry Schmitz.*

3723. FRÖHLICH, JUL. Einiges über die Waldwirtschaft in Siebenbürgen. [Forestry in Transylvania.] Wien. Allg. Forst u. Jagd Zeitg. 40: 26-27. 1922.—The transfer of Transylvania from Hungary to Rumania has added to the latter about 5½ million acres of forest land, 4 million covered with broadleaf species and 1½ million with conifers. About 4 million acres are under state administration, the remainder being private forests. Before railroads penetrated this province it was heavily forested with valuable timber, but since about 1800 it has been exploited, especially for high grade oak used for staves, interior trim, and cabinet making. In the '90s the common forests, state lands, and corporation holdings were put under government management to stop forest devastation. A shelterwood system was prescribed but it failed, and as a result reproduction is today spotty and unsatisfactory. The valuable oak has given way to inferior species such as beech and sprout hornbeam. On private holdings conditions were worse than under state supervision; today most of them are covered with brush and hornbeam, and furnish only sheep and goat pasturage. Disastrous floods have originated on these areas. In 1918, state control was extended to private lands but little was done on account of the war. The first need is the control of all forest lands to secure good reproduction of valuable species, even if artificial reforestation must be resorted to. Culture of oak in small pure stands is advocated.—*F. S. Baker.*

3724. GLORIE, H. La forêt de Houthulst. [The forest of Houthulst.] Bull. Soc. Centrale Forest. Belgique 24: 213-217, 274-283. 1921.—The history of this ancient forest is begun.—*W. C. Lowdermilk.*

3725. GODBERSEN. Erhalten oder Verzehren? [Conservation or destruction?] Zeitschr. Forst- u. Jagdw. 53: 449-454. 1921.—The Prussian state administration has instituted a system of strict financial rotation in its pine forests which will cut into the stored-up capital in order to help relieve the present intense financial burden of the state. This policy, which looks to the present rather than the future, is one which should be avoided as past history has proved. Reference is made especially to Hartig's firm resistance to the cutting of state forests after the Napoleonic wars and Reus's efforts and success in building up the wood capital on the state forests. Although the financial rotation is mathematically unassailable, it does not consider the fact that economic conditions are not governed by mathematical formulae, and that any attempt to establish economic measures by the use of such formulae is subject to errors. It can be demonstrated that the average value increment per cent for the years 1900-1910 justified the retention of such stands of mature, non- or low-increment producing stands the removal of which according to the principles of financial rotation appeared to be an urgent necessity.—*J. Roesser, Jr.*

3726. HARRER. Produktionssteigerung in der Forstwirtschaft. [Increasing forest production.] Forstwiss. Centralbl. 43: 449-468. 1921.—Suggestions are made for increasing the productivity of German forests. Great increases are possible because now not only the

average yields per acre in different states vary widely, but also the average yield for different forms of ownership within individual states. If the average yield of all German forests were brought up to that of the state forests, it would no longer be necessary to import wood.—All seed used should come not only from the proper localities but should also be taken from selected well-formed trees of rapid growth. Clear cutting over large areas should be abandoned and one of the several systems of "continuous forest" adopted instead. Construction of roads, etc., will make it possible to utilize intermediate yields from thinnings, which now can not be done in many instances. A measure deserving of very serious consideration is the extensive use of exotic species of rapid growth, especially Douglas fir (*Pseudotsuga*), which on similar sites produces much greater yields than any of the native species. Tables and curves of diameter, height, and volume growth are given which indicate that the species does as well in Germany as on the corresponding sites in western North America. Other measures deserving consideration are: the production within the country of various materials, such as pulpwood and charcoal wood instead of firewood; the production of tanbark and alcohol; and the extinction of various rights of user which hinder proper forest management.—*W. N. Sparhawk.*

3727. HAUSENDORF. Der Langenbrander Schirmkeitschlag von Forstmeister Dr. Eberhard und der Wagnersche Blendersaumschlag in Gaildorf. [The Langenbrand shelterwood wedge system of deputy forest conservator Dr. Eberhard and the Wagner border strip felling in Gaildorf.] Zeitschr. Forst- u. Jagdw. 53: 474-482. Fig. 1-3. 1921.—Witzbach and the author visited both areas, Witzbach preferring Eberhard's system. Hausendorf finds no comparison since it is not possible to compare an organic whole, such as the border strip system, with a part of such a whole, such as the wedge system, the only object of which is to secure improved methods of removing timber from the forest. Wagner's system secures removal and reproduction by cutting across the width of each compartment from the north; while Eberhard's system, after the forest has been built up by repeated thinnings to a shelterwood stand, starts the process of removal from the center of the compartment by a small tongue-like felling, which is gradually widened out wedge like to the sides of the compartment, the point of the wedge being against the wind. Wagner's system, often erroneously called a reproduction system, has as its chief object wood production through the continuous care and building up of the wood capital; it combines all desirable management features and may be considered a form of the continuous management system. Eberhard's system on the other hand seeks to secure as rapid removal and regeneration as possible; it cuts into the wood capital but does not improve the silvicultural condition of the forest. It is not as Eberhard designates it a modern, economic, continuous management system.—*J. Roesser, Jr.*

3728. HERRMANN. Bericht über die Waldsamenernte für 1921. [Information regarding the 1921 crop of forest tree seeds.] Deutsch. Forstzeitg. 36: 785-787. 1921.—Data are given regarding the seed crop of all the common species, compiled from questionnaires returned from nearly all the forest regions of Germany.—*W. N. Sparhawk.*

3729. HILEY, W. E. Recent investigations on the germination and culture of forest seeds. Quart. Jour. Forest. 15: 160-168. 1921.—The number of seedlings per 100 seed obtained on the average from a sowing in a nursery is called the "plant per cent." With Norway spruce it may be as high as 50 but is more generally nearer 20 per cent. With Scotch pine it is generally 10-20 per cent, and with larch less than 10 per cent. The ungerminated seed consists of empty seed, parasitized seed, seed which has germinated feebly and died, and seed which appears sound but fails to germinate. In spruce, Scotch pine, and Douglas fir the bulk of the ungerminated seed is of the last class. If submitted to optimum germination conditions many of these seed germinate. The percentage of seed germinating under optimum conditions is called the "germination percentage" or "germination capacity." For spruce this is frequently above 90 per cent, for pine 80 per cent, and for larch generally not more than 50 per cent. Expressing the plant per cent in terms of the germination capacity, the highest per cent obtained by Bühler for spruce was 49, for Scotch pine 24, and for larch 18; most results are much lower than these. Since it is generally believed that most seed which germinate slowly in laboratory

tests either fail to germinate or produce poor plants under nursery conditions, the custom has arisen of setting a time limit upon germination tests and disregarding for nursery purposes all seed which does not germinate 80 per cent in 10 days, Sitka spruce and Corsican pine 70 per cent in 20 days, Scotch pine 80 per cent in 20 days, Douglas fir 60 per cent in 20 days, and larch 40 per cent in 20 days. Weymouth pine does not complete germination until after 100 days and sugar pine generally shows a germination of less than 1 per cent in 30 days. Experiments indicate that seed which normally germinates in the 1st year may also undergo a process of after-ripening. Thus with freshly-gathered spruce seed it has been found that a 4-hour exposure to 122°F. raised the germination percentage from 21 to 90. Similar seed kept over until the following summer gave over 90 per cent germination without any heating. Bühler carried out extensive experiments on nursery practice which indicate that the highest number of first quality plants per yard of drill was secured through sowing 0.33 ounce Norway spruce, 0.33 ounce Scotch pine, 1.5 ounce European larch, and 2.2 ounces silver fir. On the square yard basis the sowing should be 1 ounce of spruce and pine. Forest litter proved the best cover for spruce and pine, and clay for larch and fir. The best depth of sowing was 0.4-0.8 inch for spruce and pine, 0.2-0.4 inch for larch, and 1.0 inch for fir. A covering of 1 inch was sufficient to entirely prevent larch germination.—C. R. Tillotson.

3730. HOBART, HAMPTON A. G. Continental notes. France. Trans. Roy. Scottish Arbor. Soc. 35: 50-56. 1921.—An account is given of the forest of Haguenau, the most famous forest in Alsace, including description of conditions and method of management, with results.—C. R. Tillotson.

3731. HOBLEY, C. W. On Baobabs and ruins. Jour. East Africa and Uganda Nat. Hist. Soc. 17. 75-77. 1922.—A discussion is given of the relation of the Baobab to the domestic life of the natives and thus to its distribution around villages and ruins.—Wm. Randolph Taylor.

3732. JUNACK. Organisationen der forstlichen Berufe. [Organizations in the forest profession.] Zeitschr. Forst- u. Jagdw. 53: 278-286. 1921.—The author discusses the progress of organizing the various branches of the forest profession and outlines a plan for organization to include all elements of private and public forest practice. Organizations are forming almost daily but there is lack of leadership and a definite plan to secure uniformity throughout the country. Efforts should be directed toward the formation of a universal German forest society.—J. Roesser, Jr.

3733. KAHL. Ernteaussichten für Waldsämereien im Herbst 1921. [Prospects for forest seed crops in fall of 1921.] Forstwiss. Centralbl. 43: 438-440. 1921.—The official data are presented regarding seed crops in Germany of the principal forest trees, including 3 conifers and 15 hardwoods. In general, the crop is poor for all species.—W. N. Sparkhawk.

3734. KAY, JAMES. Petawawa Experiment Forest Station. Trans. Roy. Scottish Arbor. Soc. 35: 167-173. 1921.—The author describes methods used in laying out sample plots at this station (which was established in 1918) and considers the classification of trees there and the various degrees or systems of thinning operations.—C. R. Tillotson.

3735. KEUDELL, VON. Höhenbübbichower Forst-Kultur-Methoden. [Forest cultural methods.] Deutsch. Forstzeitg. 36: 849-851. 1921.—Methods of plowing and harrowing, with before and after afforestation of old fields and reforestation of clear-cut areas, are described. These measures resulted in better survival of young trees, less damage by frosts and disease, and more rapid growth.—W. N. Sparkhawk.

3736. KRESSMANN, F. W. The manufacture of ethyl alcohol from wood waste. U. S. Dept. Agric. Bull. 983. 100 p., pl. 1-3, fig. 1-10. 1922.—Data are presented regarding amount of wood waste, history of process, and method of procedure. The temperature and pressure of

cooking should not exceed 7.5 atmospheres and should be reached as quickly as possible (15-20 min.) and maintained for 15-20 minutes. The ratio of water to dry wood should be 125:100, and of sulphuric acid to dry wood, 1.8-2:100. Under these conditions the yield of 190 proof alcohol will be 25 gallons per dry ton.—*Ira C. Swanman.*

3737. KREUTZER, E. Neue Durchforstungsgrundsätze. [New principles of thinning.] Wien. Allg. Forst- u. Jagd Zeitg. 39: 57-58. 1921. [An elaboration of a previous article of the same title (see Bot. Absts. 9 Entry 717).]—Several errors in the tabular matter and text of the earlier article are pointed out. The basis of the new system lies in the use of a spacing index (W) which is fairly constant for all ages above 30 years and varies but little with site. This index equals height (H) divided by crown spread (S) as found empirically in stands of proper development. This figure is usually about 6. Number of trees per acre (N) equals areas di-

vided by the square of crown spread (S^2). S^2 can be replaced by $\frac{H^2}{W}$ in this equation, making the normal number of trees per acre in the stand dependent only upon the value of H , which can easily be ascertained, and the arbitrarily chosen spacing index (usually 6). The formula becomes $N = \frac{\text{Area} \times W^2}{H^2}$.—*F. S. Baker.*

3738. KREUTZER, E. Zum Thema "Dauerwald." ["Continuous" forest.] Wien. Allg. Forst- u. Jagd Zeitg. 39: 259-260. 1921.—"Dauerwald" is a form of management practically identical with the selection system in its original form. It is preeminently a natural system of management, laying more stress upon the preservation of soil values and maintenance of good cover than the technical considerations of rotation, financial income, etc. The system was developed at Bärenthorn on a sandy area covered by Scotch pine stands of poor quality resulting from a clear cutting and planting policy. The rotation is "commercial" not financial. Trees are cut at a specified size rather than a certain age and furnish greater quantities of large sized timbers that are in demand. Less clear length lumbers is produced. The "continuous" forest system may be best on poor soils but its financial returns are still in question.—*F. S. Baker.*

3739. KREUTZER, E. Zur Kohlensäure-Assimilation unser Waldbäume. [Carbon dioxide assimilation of forest trees.] Wien. Allg. Forst- u. Jagd Zeitg. 40: 13-14. 1922.—The hypothesis has been advanced that growth of trees is determined by the limited amounts of carbon dioxide available, and that by increasing this gas, growth can be greatly accelerated. The theory that water and soil salts are disproportionately abundant in forest soils and can never be limiting factors has been used to explain the rapid growth secured by von Kalitsch under his "continuous" system of management. This point of view is shown to be untenable; instead, improvements in soil and moisture conditions, which influence turgor and vigor, really explain the increased growth.—*F. S. Baker.*

3740. LANG, ROSS, and RAMSEY. Survey of the township of Cumming, District of Algoma. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 86-87. 1920.—The timber in this township is nearly all spruce with some poplar and birch on the ridges. Some cedar occurs in the swamps.—The whole township is fairly level and the soil is clay or clay loam.—*A. H. McCallum.*

3741. LARSEN, J. A. Weather records at lookout stations in northern Idaho. Monthly Weather Rev. 50: 13-14. 1922.—Weather conditions at high and low mountain stations show there is greater wind movement, higher temperatures, and lower humidity during the afternoons at the lower than at the higher elevations. This is of great importance in forest fires.—*E. N. Munns.*

3742. LEVEN, GEORGE. Japanese larch (*Larix leptolepis*) and the new disease. Trans. Roy. Scottish Arbor. Soc. 35: 118-121. 1921.—Three fairly well-defined types of Japanese

larch appear among the immature specimens of Japanese larch in plantations, the fissure-barked, the flake-barked, and the smooth-barked. These vary not only in their bark characteristics but to some extent in their habits of growth and their frequency. The suggestion occurs that the bark modifications serve to protect the cambium from various injuries. No specimens of the flake-barked type injured by *Phomopsis* sp. have come under the writer's observation while numerous stems of each of the other 2 types have been observed badly affected by the disease.—C. R. Tillotson.

3743. LOCKER. Alpe, Wald und Weide. [Alpine pasture lands and forests.] Wien. Allg. Forst u. Jagd Zeitg. 39: 192-193. 1921.—Food-stuff production is urgent in Austria and has lead to overgrazing on the alpine meadows. There is a tendency to favor pasturelands over woodlands. Grazing is sufficiently heavy in alpine woodlands to destroy much of the reproduction. The forage production in such places is small. The damage to the forest is not offset by the value of the grazing. Game preserves in these regions are usually overstocked, and the tree damage in them is as great as when domestic stock is grazed. There is urgent need to emphasize the indirect as well as the direct benefits of alpine forests at this time.—F. S. Baker.

3744. LÖFFELMANN. Fichtenwirtschaft im Erzgebirge. [Spruce management in the Erzgebirge.] Wien. Allg. Forst u. Jagd Zeitg. 39: 265-267, 277-278, 280-291. 1921.—The Erzgebirge (Saxony) present a difficult field for the culture of crops; both soil and climatic conditions are unfavorable. Unusual methods of forest planting have been developed, especially upon mountainous sites. In the valleys the usual system of hole planting is practiced but on the heights the "hill system" is used. Hills of soil 40-50 cm. high are built up from rich soil brought from moist pockets the fall before planting. The following spring a tree is planted upon each hill. In frost holes these hills are made much larger. At high elevations where the ground is occupied by brush, strips are cleared about 1½ m. apart and the brush is laid top down upon the uncut brush in adjoining strips. In these cleared strips, hills of soil are built up and planted the following spring. The method is very expensive but successful. The hills keep the trees above the frost level, eliminate competition for many years, and help protect the trees from the snow fungus (*Herpotrychia nigra*). Close spacing is not profitable in this system. In the valleys the trees are spaced much closer to keep down weeds by shading. This necessitates early thinning, advantageously done by cutting the spruce for Christmas trees leaving stumps 1 m. high; the branches left on these stumps shade the ground effectively for some time.—White pine (*Pinus Strobus*) does excellently throughout the spruce zone and endures dryness and excessive soil moisture better than spruce. In wet sites natural reproduction is often superior to clean cutting and planting, for clean cutting has the effect of so raising the water table that even with hill planting root decay is frequent, which later may cause decay of the bole.—Natural reproduction of spruce is difficult in the Erzgebirge on account of poor soil conditions. The summer temperatures are abnormally low for central Europe which, with other climatic factors, tends to prevent the formation of a deep forest mould upon which reproduction takes place readily. Natural reproduction must be secured through careful preparation. Partial strip cuttings, with the maintenance of windbreaks on the north and west sides, are used frequently. This stimulates reproduction and conserves soil moisture. In better sites patches may be cut clean or left with a few trees in the middle. These patches are usually oval in outline to prevent the full exposure of the middle to sunlight (3 tree lengths by ½ a tree length).—F. S. Baker.

3745. LOTRINIÈRE, H. G. J. DE. Methods of cheap planting. Quart. Jour. Forest. 15: 174-178. 1921.—The author discusses measures which will effect cheap planting, the advantages and disadvantages of each, and costs.—C. R. Tillotson.

3746. McAUSLAN and ANDERSON. Survey of certain township outlines in the District of Algoma. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 61-62. 1920.—About 40 per cent of the eastern portion of the land has been burned over within the last 15-20

years, and on it occurs a thick growth of poplar, birch, spruce, and jack pine. On the remainder of the area there are some good stands of white spruce, black spruce, balsam, birch, and cedar.—The area is composed chiefly of clay soil slightly broken with rock ridges and swamps. The swamps, which are underlain by very fertile soil, could be drained.—A. W. McCallum.

3747. MARSHALL, R. C. Costing and costs of formation. *Quart. Jour. Forest.* 15: 242-247. 1921.—A discussion is presented of the elements that enter into the costs of forest plantations and suggestions as to means of minimizing these costs.—C. R. Tillotson.

3748. MICKLITZ, TH. Anbau stickstoffsammelnder Gewächse in Kulturorten mit armen Böden. [Cultivation of nitrogen collecting plants on sites with poor soils.] *Wien. Allg. Forst- u. Jagd Zeitg.* 39: 189. 1921.—In many places in Bohemia and Austria, spruce (*Picea excelsa*) is managed in pure stands on a clean cutting system on lands originally bearing hardwoods. The intensive utilization and artificial handling are impoverishing the soil so that reproduction is secured with difficulty and the honey agaric (*Agaricus melleus*) and the nun moth (*Liparis monacha*) are destroying the weakened stands at an ever increasing rate. The planting of locust (*Robinia pseudacacia*) is recommended as the best means of resupplying these soils with nitrogen. Where spruce is planted near locust trees on poor soils more rapid growth and more healthy color are clearly evident. This is particularly true on sandy soils. On heath soils inclined to be acid, white pine (*Pinus Strobus*) grows better with the locust than does spruce. On wet sites white alder (*Alnus incana*) is effective in increasing the nitrogen content of the soil.—F. S. Baker.

3749. MONROY, J. A. Ein Beitrag zur Dünenaufforstung. [A note on afforestation of dunes.] *Forstwiss. Centralbl.* 43: 470-473. 1921.—After smoothing and fixing the seaward side of dunes by planting grasses and sedges, and after checking movement on the crests by inserting pine boughs, conifers should be planted on the inland slopes. Scrub pine (*Pinus montana*) and pitch pine (*P. rigida*) greatly stimulate the growth of *P. silvestris* and should be planted in the ratio of 1 to 4 of the latter species. On more moist sites just behind the dunes, beech or Douglas fir may be planted.—W. N. Sparhawk.

3750. MORRIS, J. L. Survey of the township of Kapuskasing, District of Algoma. *Ann. Rept. Minister Lands, Forests and Mines, Ontario* 1918: 79-80. 1919.—This township is covered with a good stand of timber suitable for pulpwood. It is chiefly spruce 4-9 inches in diameter with scattered areas of poplar, balsam, white birch, and cedar 5-15 inches in diameter. As the greater portion of the township is swampy it is not fitted for agricultural development.—A. W. McCallum.

3751. MULFORD, F. L. Transplanting. *Amer. Forest.* 28: 238-243. 8 fig. 1922.

3752. NECHLEBA. Versuche der Bekämpfung der Nonne mit chemischen Mitteln (Insektiziden). [Experiments in combatting the nun moth with insecticides.] *Wien. Allg. Forst- u. Jagd Zeitg.* 39: 174. 1921.—Hydrocyanic acid gas at 0.5 per cent concentration by volume is fatal with 45 minute exposures and at 3 per cent concentration in 10 minutes. It is impossible to use this in practice however as the gas kills all foliage and the necessary concentrations can not be maintained in open air. Schweinfurth's green and a barium compound "Nematin" used as sprays were almost useless due to poor adhesion and unpalatability. The addition of 5 per cent molasses helps and this with 0.3 per cent Schweinfurth's green killed 83 per cent of the nun moths (*Liparis monacha*) while 2 per cent "Nematin" killed 64 per cent. Carbolineum emulsion as a contact poison was not effective in concentrations below 10 per cent; at the latter concentration it killed 60 per cent.—F. S. Baker.

3753. P., J. Boisements des hautes fanges dominales du Hertogenwald. [Afforesting the highland bogs of the Hertogenwald.] *Bull. Soc. Centrale Forest. Belgique* 24: 217-220. 1921.—The great thickness of the peat layers of the highland bogs makes forest plantations unprofitable. Only below 600 m. and with a peat layer no thicker than 0.50 m. can plantations be recommended.—W. C. Lowdermilk.

3754. PACK, A. N. A seven hundred year logging company. *Amer. Forest.* 28: 195-198. 12 fig. 1922.—Forestry practice in a privately owned tract of 12,000 acres in the Black Forest of Germany is described.—*Chas. H. Otis.*

3755. PATTEN, T. J. Survey of a meridian line in the District of Kenora. *Ann. Rept. Minister Lands, Forests and Mines, Ontario* 1919: 73-74. 1920.—The country is timbered with jack pine, balsam, and poplar on the high land, with large black spruce in the lower tracts.—The soil on about half of the area is clay and on the remainder occur rocky ridges with sand boulders and gravel intervening.—*A. W. McCallum.*

3756. PEUTZ, VON. Die Entwicklung der Klenganstalten in den letzten 25 Jahren. [The development of seed extracting establishments in the last 25 years.] *Zeitschr. Forst- u. Jagdw.* 53: 257-277. Charts 1-5. 1921.—A description of the seed extracting establishments of Eberswald, Annahurg, and Klausenau constructed within the past 25 years shows the progress of improvement from the compartment of box type of kiln to the cylindrical kiln with preliminary drying chambers. Haack's experiments established that the injury to the seed by the heat in drying is directly proportional to the percentage of moisture in the cone. This work more or less revolutionized the industry. The source of seed should be known and collections from different sources kept separate. Small extracting establishments are, therefore, desirable and to avoid the old compartment form a "safety seed extracting kiln" has been placed on the market for small operators; this is described in detail with a chart.—*J. Roesser, Jr.*

3757. PHILLIPS and BENNER. Survey of the Black Sturgeon River pulp and timber limit in the District of Kenora. *Ann. Rept. Minister Lands, Forests and Mines, Ontario* 1919: 74-77. 1920.—This area is nearly all well timbered, only a small portion being recently burned. On the higher lands are birch, spruce, jack pine, and poplar, with spruce predominant on the lowland. No white pine of value was seen.—For the most part the soil is good, being a sandy loam. The remainder is either swamp land or rocky soil.—*A. W. McCallum.*

3758. POLLANETZ. Neben Kulturen der Forstwirtschaft. [Secondary products of forestry.] *Wien. Allg. Forst- u. Jagd Zeitg.* 40: 19-20. 1922.—It is now necessary to make the forests of Austria, especially small holdings, productive to the highest degree. The returns may be increased by utilizing secondary forest crops. These include the cultivation of wild rose seedlings (for nursery budding stock), growing rhododendrons and azaleas, ferns, and medicinal plants, especially digitalis and belladonna. Mushrooms and wild berries can also be handled at a profit. The cities always furnish good markets for edelweiss and alpine roses which may be grown in connection with forests at high elevation.—*F. S. Baker.*

3759. POSKIN, A. Influence des forêts sur le régime des eaux. [Influence of forests on stream flow.] [Rev. of: ENGLER, A. Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer. (Studies on the influence of forests on stream flow.) *Mittteil. Schweiz. Zentralanst. Forst. Versuchsw.* 12: 1-626. 58 pl., 127 tables. 1919 (see *Bot. Anst.* 9, Entry 710).] *Bull. Soc. Centrale Forest. Belgique* 24: 292-298. 1921.

3760. PRATT, E. R. Stainy or butterfly markings on willow timber. *Quart. Jour. Forest.* 15: 186-190. 2 pl. 1921.—Nearly all willow timber now produced is more or less faintly marked by slight stains which arise from the entry of water, sometimes through knots or wounds but principally through minute horizontal cracks in the bark. The water enters into the cambium and brings with it a little of the tannin from the bark. The rising and falling sap spreads the stain up and down and after several years the figure very much resembles that of a butterfly or moth. It is unlikely that the stain causes any deterioration in the quality of the timber.—*C. R. Tillotson.*

3761. PULLING, A. V. S. Simple forest conservation. Amer. Forest. 28: 211-217. 13 fig. 1922.—Shingles, news-print paper, painting, cross-ties, and building lumbers are concerned.—Chas. H. Otis.

3762. PR, A. Le hêtre à la Vallée de Joux. [The beech in the Joux River valley.] Jour. Forest. Suisse 72: 162-165. 1921.—Contrary to the former report on beech, *Fagus sylvatica* is found at the higher elevation in the forest of the valley of the Joux. On the ridge of Carroz and of Burlignière, at elevations ranging from 1100 to 1300 m., occur large trees not over 100 years old. The general scarcity of the beech may be due to cutting for charcoal.—W. C. Lowdermilk.

3763. RECORD, S. J. Novel trees and forest products. Amer. Forest. 28: 235-237. 6 fig. 1922.—The author describes the making of clothing from wood, wood strains, plugging holes in crossties, and the pine-straw roads of Florida.—Chas. H. Otis.

3764. RICHARDSON, H. G. Some remarks on British forest history. Trans. Roy. Scottish Arbor. Soc. 35: 157-167. 1921.—The author discourses on British forest history of the Middle Ages.—C. R. Tillotson.

3765. ROSEMAN. Allerlei Fragen und Folgerungen zum "Dauerwald." [Concerning the "Dauerwald."] Deutsch. Forstzeitg. 37: 41-45. 1922.—The "Dauerwald" differs from the "Plenterwald," or selection forest, in that cuttings in the latter are governed by the needs of the stand alone, with only incidental regard to the needs of the soil, while in the former the main consideration is to maintain or create soil conditions favoring best stand development. In the ordinary even-aged forests there is usually a period of about 6 years after planting before the young stand forms a continuous cover, followed by a period (15th-30th year), before thinnings commence, when the stand is too crowded; these conditions result in deterioration of the site and a considerable lost increment. Rosemann believes, however, that the abandonment of the generally prevailing clear-cutting system would not be wise, because the Dauerwald system has not been given a thorough trial, requires constant careful technical supervision, and, contrary to the claims of its advocate, would result in greater fire hazard. Clear-cutting, followed by soil cultivation, with improvement cuttings in the 15th and 20th year, leaving the felled material to enrich the soil, and regular thinnings every 5 years after the 25th, with natural reproduction, will accomplish all that is claimed for the Dauerwald, without its disadvantages.—W. N. Sparhawk.

3766. ROWE, M. H. The intermediate treatment of woodlands. Quart. Jour. Forest. 15: 179-186. 1921.—The author discusses the causes of the open nature of the elder type of British woods (forests) and the silvicultural methods of treating woods to make them most productive and to keep them in the best condition.—C. R. Tillotson.

3767. RUBNER. Ökologische und pflanzengeographische Lichtfragen. [Ecological and phytogeographical problems of light.] Forstwiss. Centralbl. 43: 327-345. 1921.—The work during the last decade of various investigators on light in relation to forest growth is discussed. Seven phases of the problem are considered: (1) tolerant and intolerant species; (2) light and germination; (3) light, ground flora, and reproduction; (4) light and form of crown; (5) variation in light-climate according to latitude and altitude; (6) forest trees and light-climate; (7) volume production and energy of light rays.—Especially noteworthy under (1) is the work of Wiesner on minimum light utilization, and on the basis of his work as well as that of Oelkers, Knuchel, Boysen, Jensen, and Bühler, the writer considers that the conception of tolerants and intolerants is justified, in spite of the ideas to the contrary advanced by Borggreve, Fricke, and Max Wagner.—Under (2) the work of Haak, Kinzel, and Bühler on the effects of light intensity, color of light rays, and duration of lighting on the germination of seeds is discussed, especially interesting being the fact that such effects are very striking, and that seeds of different species respond in different ways.—Little has been done since the work of Cieslar

on the 3rd subject, but more should be done, because of the relation of light intensity to tree reproduction as well as to the density and composition of the ground cover, which may seriously affect tree reproduction by competing with it for light and moisture.—Under (4) mention is made of trees with drooping branches, adapted to utilize all the available light, and pyramidal trees with upright branches, adapted to lower latitudes where sunlight is intense.—While the length of summer days increases with latitude, light rays strike the ground more obliquely and consequently with less warmth, and moreover the blue rays are much reduced. At high altitudes, on the contrary, the proportion of blue rays and the intensity of direct light are greater, resulting in a greater variety of plants but much less height growth, except on steep slopes, where the arctic regions get more direct light and warmth than the high altitudes.—Wiesner found that light requirements of given species increase northward, and that crowns tend to change in form, with fewer branch orders and more open foliage. The pyramidal form is also common both at high latitudes and at high altitudes. It is important from the forester's standpoint that the more tolerant strains of a given species, developed under certain geographical conditions, have a better stem-form than the less tolerant strains.—Max Wagner's conclusion that volume production per unit area decreases toward the north because of decreasing energy of the sun's rays is incorrect because he doesn't take the decreasing precipitation into account. Both factors may have some influence on yields.—*W. N. Sparhawk.*

3768. RUBNER. [REV. OF: HEINKINHEIMO, OLLI. Der Einfluss der Brandwirtschaft auf die Wälder Finnlands. (Effect of the broadcast burning practice on Finland's forests.) Arbeit. Forstwiss. Ges. Finland 4: 1915.] Forstwiss. Centralbl. 43: 345-353. 1921.—The reviewer presents a summary of the book, which discusses the practice once prevalent, not only in Finland but also in parts of Sweden and Russia, of cutting and burning extensive areas of forest in order to cultivate the soil, and the effects of this on the composition and character of the forests. On frequently burned lands the alder predominates; on land burned less often, birch; on land burned only occasionally, pine; white spruce predominates only on land that has not been handled in this way.—Though the book has little significance for modern forest practice, it is of value for its treatment of the biological basis of silviculture, and especially of the natural competition of species. While the author mentions occurrence of seed years, disseminative powers of the seed, sprouting capacity, and juvenile height growth as important factors in the competition, he does not mention susceptibility to late frosts or tolerance, both of which have much to do with the distribution of spruce. Especially noteworthy are the data regarding sprouting capacity of the birches, alder, and aspen.—*W. N. Sparhawk.*

3769. SCHENKA. Anregungen zur Führung eines Merkbuches auf der Försterei mit einigen Entwürfen dazu. [Suggestions for a record-book for forest ranger districts.] Deutsch. Forstzeitg. 36: 769-771. 1921.—Forms are suggested for recording personnel data, work accomplished, results of management, and other data.—*W. N. Sparhawk.*

3770. SCHMIEDERACH, O. Die topographische Grundkarte und die Forstwirtschaft. [Topographical soil charts and forest management.] Zeitschr. Forst- u. Jagdw. 53: 501-502. 1921.—There is an urgent national economic and technical demand for a revision of the present topographic charts. More minute and careful detail, with especial reference to a larger number of measured points of elevation, is suggested. The writer recommends 150-350 points of elevation per square km. and a scale of 1: 10,000 as sufficient for the technical application of the topographic (height-line) charts in the management of forests.—*J. Roesser, Jr.*

3771. SCHRÖDER. Die Erziehung der Rotbuche in reinen Beständen und in Mischung mit Eiche und Esche. [Growing beech in pure stands and in mixture with oak and ash.] Deutsch. Forstzeitg. 37: 273-277. 1922.—Cultural methods described consist principally of thinnings, improvement cuttings, and light cuttings begun at a very early age and repeated every few years to favor the final cut and at the same time maintain favorable soil conditions.—*W. N. Sparhawk.*

3772. SCHUBERT, J. Zur Inhaltsberechnung von Baumstämmen. [Volume calculation of tree stems.] Zeitschr. Forst- u. Jagdw. 53: 482-486. Fig. 1-3. 1921.—A discussion is presented of the accurate measurement of stem contents with the use of the 2 Gauss formulae.—J. Roeser, Jr.

3773. SCHÜPPER. [Rev. of: HUFNAGEL, LEOPOLD. Praktische Forsteinrichtung. [Practical forest regulation.] 3rd ed. Wilhelm Friek: Leipzig and Vienna, 1921.] Forstwiss. Centralbl. 43: 436-437. 1921.—The book treats the problems of forest regulation in a brief, easily understandable, and thoroughly practical way.—W. N. Sparhawk.

3774. SCHWAPPACH. [Rev. of: Rate of growth of conifers in the British Isles. Forest Commission [Great Britain] Bull. 3. 86 p. 1920.] Zeitschr. Forst- u. Jagdw. 53: 179-182. 1921.—The author discusses briefly the English war method of securing data for the preparation of growth and yield tables. He presents 2 tables comparing the yield of Scotch pine and fir stands in Great Britain and in Germany for the oldest age classes in the English tables and the yield of Douglas fir stands of 15, 30, and 45 year age classes in England and Germany. Pine thrives better in Germany than in England, but fir and Douglas fir grow better in England and Scotland.—J. Roeser, Jr.

3775. SEEHOLZER. Natürliche Bestandsbegründung. [Natural establishment of stands.] Forstwiss. Centralbl. 43: 412-420. 1921.—The author, referring especially to the new shelterwood system of silviculture advocated by many foresters, points out that there can be no one best system, and that methods of treatment must be adapted to widely varying local conditions. He illustrates his contention by describing the unsatisfactory results of shelterwood cuttings on 2 forests with which he is familiar. Spruce, especially, gives poor results with this method.—W. N. Sparhawk.

3776. SEYDEL, H. VON., SCHRÖDER, HILDERRANDT, und SCHWAPPACH. Zum Anbau der Banksiefer in reinen Beständen. [Growing Banks' pine in pure stands.] Deutsch. Forstzeitg. 37: 331-333. 1922.—These foresters agree that Banks' pine (jack pine, *Pinus Banksiana*, *P. divaricata*) is not to be considered as a forest crop except on the very poorest sites, and even there other species, such as *P. silvestris*, should be introduced under shelter of the jack pine as soon as the site conditions will permit. Jack pine makes a desirable nurse tree to assist the establishment of more exacting species on unfavorable sites, and is also useful for filling openings in Scotch pine stands because of its rapid height growth. Schwappach recommends the use of pitch pine (*P. rigida*) in mixture with Scotch pine on poor sites as it tends to improve soil conditions and dies out after a few years, thus automatically accomplishing the thinning that is needed on such sites.—W. N. Sparhawk.

3777. SPEIGHT and VANNOSTRAND. Survey of certain township outlines in the District of Sudbury and Timiskaming. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 58-61. 1920.—Much of the area covered has been burned over within recent years but there are still some good stands of timber. Along both banks of the Nat River occurs a considerable area of exceptionally fine jack pine (*Pinus Banksiana*). There is a great deal of spruce of pulpwood size, also balsam, scattered Norway pine (*Pinus resinosa*), poplar, and birch.—Light clay soil intersected by sandy ridges covers a large proportion of this area.—A. W. McCallum.

3778. STAMMINGER. Neuzeitlicher Ausbau der Holzverwertung auf gemeinsame Grundlage. [Revision of timber valuation on a uniform basis.] Forstwiss. Centralbl. 43: 361-376. 1921.—The great diversity of grades now recognized in the timber trade, for the different species and for different states of Germany, should be replaced by one uniform set of grades for all species, based on sizes and quality of the wood. Moreover, a uniform base price should be established for each grade, and current prices in different localities should be expressed in terms of the base price. It is also desirable that uniform standard forms of sale contract be adopted, in

order that price quotations for different localities or for different periods may be comparable for use in statistical work. A standard method of grading is outlined, and suggestions are given regarding terms of sale.—*W. N. Sparhawk.*

3779. STIEBNER. Einiges über den Zweck des Bauernwaldes und die Vorbedingungen zu besserer Waldwirtschaft. [Concerning peasant woodlots and better forestry.] *Wien. Allg. Forst- u. Jagd Zeitg.* 39:291. 1921.—The inefficiency of small woodlots as producers of wood is often cited as an example of mismanagement. While state forests produce 4 cubic m. of wood per hectare per year, the woodlots produce but $\frac{1}{2}$ cubic m. They are primarily producers of litter (leaves, faggots, etc.), and timber is a by-product. The remedy is not political and can not be effected by laws or the union of these small holdings into communal forests unless they are managed by trained men who will make timber growing the first consideration, but so manage the forest that the peasants will still obtain litter annually.—*F. S. Baker.*

3780. STIRLING. Planting distance for Douglas fir. *Trans. Roy. Scottish Arbor. Soc.* 35. 9-15. 1921.—The planting of Douglas fir and Sitka spruce in mixture with slower-growing conifers is considered a waste of time and money. Sooner or later the Douglas fir or Sitka spruce suppresses and crowds out the slower-growing trees before the latter have any value as thinnings or have had any effect in suppressing the side branches of the former. The result is the same as if the fir and spruce had originally been given a wide spacing. For the production of pit wood a spacing of 7 feet has been suggested. For the production of the best quality of timber a much closer spacing is desirable. Close spacing only partially restrains branch growth. If clean boles are required, hand pruning must be undertaken. Natural cleaning of stems begins at an age of about 40 years.—*C. R. Tillotson.*

3781. STORY, FRASER. The forests of Bialowieska. *Quart. Jour. Forest.* 15: 169-173. 1921.—A description is given of this forest situated in the middle of the Russian province of Grodno. It was preserved by the Czar for the chase, and thus affords a particularly good example of a natural forest of that region.—*C. R. Tillotson.*

3782. SUTCLIFFE and NEELANDS. Survey of township outlines between Ground Hog and Kapuskasing rivers, in the District of Timiskaming. *Ann. Rept. Minister Lands, Forests and Mines, Ontario* 1919: 80-83. 1920.—The eastern part of the area surveyed was burned 20-30 years ago but is being rapidly reforested with birch, poplar, spruce, and jack pine. Some good jack pine stands suitable for tie timber escaped fire. In the western portion of the area the timber is large and dense, being composed of spruce, balsam, balm of Gilead, poplar, birch, and cedar. Some white pine and jack pine are also present.—*A. W. McCallum.*

3783. TILLOTSON, C. R. Storage of coniferous tree seeds. *Jour. Agric. Res.* 22: 479-510. 1921 [1922].—Seeds of the following species were stored under a variety of conditions: *Pinus contorta*, *P. ponderosa*, *P. monticola*, *P. Strobus*, *Picea Engelmanni*, *Pseudotsuga taxifolia*. The details of the experiments are shown in graphs and extensive tables. Seed thoroughly air dried and stored in air-tight containers kept best throughout the 5 years of the experiment. Under such conditions temperature and geographic location of storage are of little consequence. The germinative energy as well as germinative ability of seeds stored in air-tight containers is superior, even after only 1 year of storage, to that of seed stored in paraffined paper, paper, cloth, and oiled cloth bags. The sequence represents the order of merit of the containers included in the test. Rapid deterioration goes on in any of these containers, except the air-tight one, so that after 1 or 2 years the seeds of Englemann spruce, Douglas fir, and whitepine are practically worthless.—Storage at "room" temperature is superior to storage at fluctuating or fairly uniform low temperatures. For ordinary storage, locations of relatively high altitude and low relative humidity are best.—The sustained vitality of the seeds tested is in the following order, the strongest being mentioned first: *Pinus ponderosa*, *P. contorta*, *P. monticola*, *P. Strobus*, *Picea Engelmanni*, *Pseudotsuga taxifolia*.—*D. Reddick.*

3784. WEBER, HEINRICH WILHELM. Die Gliederung unserer Wissenschaft in eine Produktionslehre und eine Betriebslehre, ihre Geschichte und ihre kritische Würdigung. [Classification of the science of forestry.] Forstwiss. Centralbl. 43: 281-289, 391-399, 421-435. 1921.—Weber discusses the various conceptions of forestry as a biological science and as an economic science, and concludes that there has been a tendency to over-emphasize the idea of financial profit in producing material goods (timber) while forgetting the real purpose of creating cultural values, which include both material and imponderable products. He classifies forestry into 3 phases: the science of production; the science of utilization; and the economic phase, the weighing of results against costs.—*W. N. Sparhawk.*

3785. WEIBECKE. Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung. [East German pine forests. Their renewal and retention.] Zeitschr. Forst- u. Jagdw. 53: 294-305. 1921.—Seed cultures are discussed under the subheadings (1) soils upon which sowing can be done; (2) time of sowing; and (3) the seed. Sowing of forest seed is generally practicable. Poor results are avoided to the extent that sparse and valuable humus is conserved. The necessity of planting occurs on only a small part of the cultural areas; 10 per cent of the total may be above the average. Pine seed must be planted April 10-15, preferably earlier. Nurseries should be sown about April 8 and planting should be done between March 25 and April 15, at the latest April 25. The best seed is obtained from cones allowed to open naturally and collected from fellings in advanced pole-wood and in mature stands. Seed-husking establishments find no favor with the author.—*J. Roesser, Jr.*

3786. WITZGALL. Noch einmal der Wagnersche Blendersaumschlag und der Langenbrander Schirmkeilschlag. [Note regarding Wagner's selection strip cutting and the Langenbrand shelterwood method.] Forstwiss. Centralbl. 43: 473-474. 1921.—It is argued that Wagner's method does not leave enough to the judgment of the forester, and the Langenbrand method also has the advantage of being a further development of an old proved method of silviculture, while Wagner's is new.—*W. N. Sparhawk.*

3787. WOOLSEY, T. S., JR. Forestry in Connecticut. Amer. Forest. 28: 213, 243. 1922.

3788. ZAVITZ, E. J. Report of the Forestry Branch, 1918. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1918: 142-160. Fig. 1-10. 1919.—An annual report with summarized statistical data is presented. Forest fires are classified as to causes. It is shown that 46.5 per cent were of railway origin, 8.2 per cent caused by campers, 8.1 per cent by settlers, and 23.2 of unknown origin.—At the Provincial Forest Station in Norfolk County 50 acres of scrub oak lands were underplanted with white pine. A preliminary survey of the sand dunes in Prince Edward County was made with a view toward reforestation.—White pine blister rust was found to be generally distributed in southern Ontario but it has not yet reached the northern part of the province. At the Provincial Forest Station 4 men worked for 4 months in eradicating *Ribes* on an area of about 100 acres which, however, was somewhat abnormal. This indicates the difficulty of carrying on such work on large areas of wild lands.—*A. W. McCallum.*

3789. ZAVITZ, E. J. Report of the Forestry Branch, 1919. Ann. Rept. Minister Lands, Forests and Mines, Ontario 1919: 105-125. 2 fig. 1920.—An annual report with summarized statistical data is presented. Owing to the unusual drought, fires were more numerous and of greater extent than usual. The most important causes were: railways, 37 per cent; campers, 9 per cent; settlers, 7 per cent; and unknown, 36 per cent. Summing up the fire protection situation it is concluded that fire control will not improve until it is recognized (1) "That forest protection is a specialized business requiring a permanent trained organization, and (2) that no organization can give efficient service without the adoption of the merit system in making appointments and promotions."—In Ontario the problem of reforestation has 2 distinct phases, (1) the production of continuous wood crops on the Crown lands of the Laurentian plateau in northern Ontario comprising about fifty million acres, and (2) the reforesting

of the larger waste areas and the encouragement of the private woodland owner in southern Ontario. Planting cannot be considered because of the fire hazard. Adequate fire protection and regulation of cutting to secure natural regeneration are the primary requisites in this region. The establishment of demonstration forest stations to plant and manage waste lands and to supply planting stock to private owners is considered essential.—A. W. McCullum.

3790. ZEDERNAUER, E. Experiments on the storage of seeds of coniferous trees. Trans. Roy. Scottish Arbor. Soc. 35: 137-147. 1921.—This is a translation of an article by the author in the Mitteilungen aus dem Forstlichen Versuchswesen Oesterreichs, 1910. The outstanding conclusion appears to be in favor of a cool storeroom or ice cellar for seed storage on a large scale. Low temperatures and high air or soil humidity are factors which act favorably in natural and artificial storage.—C. R. Tillotson.

3791. ZUCKER, M. PH. Rotbuchenholz. [Wood of the red beech.] Forstwiss. Centralbl. 43: 289-297. 1921.—For centuries, beech played a very important role in Germany forestry, being valued especially for its excellent qualities as fuel wood. With the increasing use of coal, following railroad development, beech wood was less in demand, and for a time the species threatened to give way entirely to conifers. Then came the development of many industrial uses for the wood, including the bentwood chair industry, which uses in Saxony alone between 20,000 and 25,000 cubic m. a year; the children's wagon, sled, and cart industry, using 30,000 cubic m.; and the manufacture of vehicles, wooden soles, wooden soles, heels and shoe-lasts, furniture, machinery, flooring, and woodenware. During the war a number of other uses developed, including trench boards, fuse plugs, shell boxes, and gunstocks. In 1917, beech was used for 1,236,000 gunstocks, walnut and birch for 2,027,000; in 1918, arrangements were made for the manufacture of 12,000,000 gunstocks from 3 species. Wooden soles were made at the rate of 500,000 pairs a month in 1917, and the estimated production for 1918 was 150,000,000 pairs, requiring 1,000,000 cubic m. of sawed lumber or 3,000,000 cubic m. of stemwood. A "beech-wood industries association" has recently been formed, in part to look out for adequate future supplies and to encourage increased production of the species.—W. N. Sparhawk.

GENETICS

ORLAND E. WHITE, *Editor*

See also in this issue Entries 3273, 3279, 3286, 3295, 3302, 3334, 3343, 3365, 3379, 3393, 3442, 3451, 3625, 3949, 3986, 3996, 4027, 4028, 4055, 4074, 4207, 4210, 4221, 4223, 4226, 4232, 4249, 4557, 4679, 4683, 4686, 4692, 4796, 4885)

3792. ANONYMOUS. [German rev. of: FLEISCHER, BRUNO. Untersuchung von sechs Generationen eines Geschlechtes auf das Vorkommen von myotonischer Dystrophie und anderer degenerativer Merkmale. (Investigations of six generations of a strain on the occurrence of myotonic dystrophy and other degenerative characters.) Arch. Rass.- u. Gesellschaftsbiol. 14: 13-38. 14 fig. 1922.] Naturwiss. Umschau 11: 63-64. 1922.

3793. ANONYMOUS. [German rev. of: HAECKER, VALENTIN. Allgemeine Vererbungslehre. (General genetics.) 10 X 24 cm., ix + 444 p., 149 fig. Friedr. Vieweg & Sohn: Braunschweig, 1921.] Anat. Anzeiger 55: 414. 1922.

3794. ANONYMOUS. [Rev. of: KNIGHT, M. M., IVA L. PETERS, and PHYLLIS BLANCHARD. Taboo and genetics: A study of the biological, sociological and psychological foundation of the family. xv + 255 p. Kegan Paul and Co.: London; Moffat, Yard and Co.: New York, 1921 (see Bot. Absts. 11, Entry 2469).] Nature 109: 235. 1922.

3795. ABRAMI, P., et G. SENEVET. A propos des gamètes du Plasmodium praecox; proportion variable des éléments mâles et femelles. [Concerning the gametes of Plasmodium praecox; variable proportions of the male and female elements.] Bull. Soc. Pathol. Exotique

13: 167-172. 1920.—In a statistical study of the occurrence of the parasite *Plasmodium praecox* in the blood of malarial patients, the authors find that the male gametes disappear before the female gametes, a fact which they believe responsible for the discordant results of other investigators.—A. F. Blakeslee.

3796. ALDABA, VICTOR C. The pollination of coconut. Philippine Agric. 10: 195-207. 1 pl. 1921.—Female flowers may be pollinated by pollen from the same tree or other trees. Observations were made on the time of shedding pollen by male flowers and the time when the stigma of the female flower is receptive. Wind and insects serve as agents in pollination. Unpollinated flowers apparently do not produce nuts. Pollen germinates in 5-30 per cent sugar solutions. Pollen remains viable 2-9 days.—Sam F. Trelease.

3797. ALLEN, BENNETT M. Influence of the thyroid gland and hypophysis upon growth and differentiation. Jour. Heredity 12: 414-422. 1921.—The author reviews the present state of knowledge.—Seavall Wright.

3798. ALVERDES, F. [German rev. of: GOLDSCHMIDT, RICHARD. Die quantitative Grundlage von Vererbung und Artbildung. (The quantitative basis of heredity and species formation.) 163 p., 23 fig. Julius Springer: Berlin, 1920.] Arch. Entwicklungsmech. 50: 620-621. 1922.

3799. ALVERDES, F. [German rev. of: RUŽIČKA, VLADISLAV. Restitution und Vererbung Experimenteller kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. (Restitution and heredity. Experimental, critical, and synthetic contribution to the problem of determination.) Vorträge u. Aufsätze II. Entwicklungsmech. Org. 23. 69 p. 1919.] Arch. Entwicklungsmech. 50: 619-620. 1922.

3800. ALVERDES, FRIEDRICH. Rassenstudien an Fischen aus dem Carlsberg-Laboratorium in Kopenhagen. [Racial studies on fish from the Carlsberg Laboratory in Copenhagen.] Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 167-169. 1920.—The paper is a brief statement of Johs. Schmidt's racial studies in fishes with especial reference to *Zoarces viviparus* [see Bot. Absts. 11, Entry 314]. Numerous "local races" occur with respect to number of vertebrae, number of rays in right pectoral fin, number of hard rays in dorsal fin, and pigment spots in dorsal fin. The investigations are directed toward discovering the role of heredity and environment in determining these local races. Influence of heredity is determined by comparing the mother with her unborn or new-born young. All of the characters noted above are numerically fully developed at birth. The influence of environment is studied by comparing population samples from various localities where conditions of salinity and temperature are known. Schmidt believes that a fish local "race" is largely a statistical conception implying a mixture of diverse genotypes, and that the average values characterizing a "race" are primarily dependent upon the quantitative proportions of the various genotypes, and secondarily on environment. Population samples from localities differing markedly in salinity may be identical while samples from localities having same salinity may not overlap at all (number of vertebrae). On the other hand, a high number of vertebrae in young from a single female is always correlated with a high maternal number. Some environmental effect is shown by transplanting populations whose average composition is known. Populations transplanted to a new location with somewhat higher temperature and lower salinity (21-12 per cent) showed an appreciable increase in number of vertebrae as compared with controls kept in the original locality.—A. W. Bellamy.

3801. ANDERSON, E. G. The inheritance of salmon silk color in maize. Cornell Univ. Agric. Exp. Sta. Mem. 48, 539-554. 4 pl. 1921.—The origin and inheritance of salmon silk color in maize is described. This character is recessive to the common green color and has been given the factorial symbols *Sm sm*. The linkage relations of salmon silk with the factors *B*, *A*, *R*, *Pl*, and *Y* were tested and it was found that this character was independent of the

first 3 but linked with the latter pair. A 3-point test was made of the relations of Y , Pl , and Sm with the following results: $Y-Pl$ 29.7 per cent cross overs, $Pl-Sm$ 10.01 per cent cross overs, and $Y-Sm$ 36.79 per cent cross overs, their relative map order being $Y-Pl-Sm$.—J. H. Kempton.

3802. BALL, GORNON. Variation in fresh-water mussels. Ecology 3: 93-121. 6 fig. 1922.—Eight species of fresh-water mussels from known localities were measured as to length, diameter, obesity, height, and prominence of tubercles, and these correlated with the type of environment, such as rate of stream flow. (1) Shells of the same species often change in shape according to the size of the stream in which they occur. Shells of smaller streams are less swollen than those of larger streams. (2) Certain groups of shells show this correlation much more strongly than do others; in some cases there is apparently no relation between the size of the stream and the degree of obesity. (3) Other factors in addition to the size of the stream apparently enter into the determination of the degree of obesity. (4) For most species considered, young shells are more swollen than older ones. (5) There is frequently a correlation between sex and obesity; either the male or female shell may be the more swollen. (6) In some cases the development of the tubercles is greatest in the large-stream forms; in other cases tubercle development is the same throughout the stream. (7) Usually the flattest and the most swollen forms are connected by a complete series of intergrades. It is uncertain whether or not these variations, except those connected with sex, are inherited.—H. S. Colton.

3803. BANTA, ARTHUR M. Selection in Cladocera on the basis of a physiological character. Carnegie Inst. Washington Publ. 305. 170 p., 19 fig. 1921.—On the basis of response to light the author selected plus and minus strains in pure lines of Cladocera (*Daphnia pulex*, *D. longispina*, *Sinoccephalus expinosus*) which reproduce parthenogenetically with but 1 maturation division. Although most of these lines showed no effect of selection (and a few lines showed but a slight effect), in 1 line a very decided effect was evident. Since genetic segregations are impossible, unless by some novel unknown method, the author thinks that many small changes (mutations?) in the genetic factor or factors may account for the result of this experiment.—H. S. Colton.

3804. BARKEA, B. T. P., and G. T. SPINKS. Fruit breeding investigations. Jour. Bath and West and Southern Counties Soc. 14: 163-172. 1920.—A preliminary note is presented on the breeding of apples, plums, cherries, currants, gooseberries, raspberries, and strawberries.—J. I. Lauritzen.

3805. BATESON, WILLIAM. Evolutionary faith and modern doubts. Science 55: 55-61. 1922.—The origin of species was the baffling problem to biologists even through the period when variations were thoroughly studied. Mendelism, which was hailed as pointing to a solution, has not provided one. The evidence obtained from these sources is inapplicable to the question of origins. Emphasis is now placed upon gametes instead of zygotes, and many phenomena of genetics have been referred to details of nuclear structure. Yet variations attributed to changes in this structure are not beginnings of species. That evolution occurred is obvious, but the origin and nature of species are still mysteries. Frequent sterility of species with one another is largely ignored. Variations now arising under observation are not sterile with one another, hence are not beginnings of species. Sexual incompatibility must have been due to something gained, while variations seen to arise are with few exceptions losses. Complete knowledge of evolution awaits the production of a sterile hybrid from 2 completely fertile parents known by observation to have descended from a common origin. Specific difference probably pertains to the base upon which transferable characters now being studied by geneticists are implanted, and of that base absolutely nothing is known.—A. Franklin Skull.

3806. BATESON, WILLIAM. Genetical analysis and the theory of natural selection. Science 55: 373. 1922.—In correcting the statement made in a previous paper that Ray was the first to emphasize sterility of interspecific hybrids, the author repeats Ray's principle

that all forms which might have come from the same parent belong to the same species. He reaffirms the view that paleontology delimits the outline of evolution but does not furnish evidence that can determine interspecific relationships. The central tenet of Darwinism that species are merely culminations of varietal differences is not easily reconcilable with the new knowledge.—A. Franklin Shull.

3807. BATHER, F. A. Biological terminology. *Nature* 108: 271. 1921.—The most important problem in the study of variations is the determination of their cause. Is the germinal change sudden and the somatic change gradual? Or may the factorial change itself be gradual? May somatic modifications influence the germ cells? How is it that a factor change apparently induces an apparently harmonizing character change? Biologists see the importance of these questions but critical experiments to answer them are not easy to outline.—L. R. Waldron.

3808. BAUR, E. Mutanten von *Antirrhinum*. [Mutants of *Antirrhinum*.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 27: 241. 1922.—The author emphasizes that in *Antirrhinum* mutations are uncommonly frequent but the majority differ so little from originating strains that they are liable to be overlooked. These small mutations are of great selection value. He considers the hypothesis of widespread constancy in pure lines as incorrect.—J. P. Kelly.

3809. BEATTIE, J. H. Recent progress in the development of improved strains of greenhouse tomatoes, lettuce and cauliflower. *Proc. Amer. Soc. Hort. Sci.* 18: 26-28. 1921 [1922].—A report is given of material progress in the development of strains for greenhouse forcing. The commercial varieties from which strain selections have been made are Erfurt's Dwarf Forcing cauliflower, Grand Rapids lettuce, and Sterling Castle and Sunrise tomatoes.—H. A. Jones.

3810. BENEDICT, R. C. The origin of new varieties of *Nephrolepis* by orthogenetic saltation. II. *Amer. Jour. Bot.* 9: 140-157. 6 pl. 1922.—The author describes reversions in *Nephrolepis exaltata*, meaning changes from progressive varieties (derived originally from *bostoniensis*, either directly or indirectly) back toward the type *bostoniensis*. Among the primary sports of *N. exaltata bostoniensis* there was a mutation of intermediate size from a dwarf, a possible reversion to a fertile condition and a reduction in stability as shown in a decrease in proportion of divided leaves. Among those sports of *bostoniensis* termed secondary (i.e., coming directly from its primary ones) there arose also forms with reduced stability and with changed stature in addition to reversions affecting degree of leaf division. Reversion was found more frequent than progressive variation.—J. P. Kelly.

3811. BERGSTRAND, H. Sur la variation des bactéries. [On the variation of bacteria.] *Compt. Rend. Soc. Biol.* 86: 492-494. 1922.—The author discusses the findings of Neisser and Marsini, 1907, in experiments on *Bacillus Coli* grown on Endo's medium, in which 2 strains of the organism appeared. From a repetition of the work and further experiment it is deduced that a single organism may give rise to at least 2 strains (in this case A and B), differing in cultural characteristics, agglutination, motility, unaffected by passage through animals, but reverting to the original strain when allowed to rest. It is the opinion of the author that bacteria do not form a special group, but a sub-class of the true fungi.—Andrew I. Dawson.

3812. BLARINGHEM, L. Mutantes et hybrides. [Mutants and hybrids.] *Ann. Sci. Nat. Bot.* X, 3: 1-31. 1921.—The author examines the literature bearing on the origin of species by mutation and by hybridization. He begins by stating the essential characteristics of De Vriesian mutation. He emphasizes the value of sharply distinguishing fluctuating variations, which are continuous and reversible, from mutations, which are discontinuous and irreversible. Four-leaved clovers may show mutation perceptible with difficulty because of the fluctuation superposed on the mutation. The simplest case of mutation is the "regressive variety," which differs from the type in a feature that follows Mendel's original scheme. The

author considers such cases limited in number and does not agree with the view of universality of the Mendelian mode of transmission. The *Drosophila* work is considered as only exceptionally touching upon true Mendelian heredity. Morgan's "geographical scheme" for location of genes is considered limited to his laboratory material. Nevertheless, De Vries's use of lethal factors in recent writings shows more or less adhesion to Morgan's school. The mutations of *Oenothera lamarckiana* are rarely "regressive" varieties but very often elementary species. Although long studied, there is difference of opinion as to the origin of *Oenothera* mutations just as there is concerning the origin of *O. lamarckiana* itself. Other species have been found with a similar mutability. Bartlett's "mass mutation" calls for a distinction of mutations into the frequent and rare, but the former are conveniently interpreted by simple Mendelian segregation. Other *Oenothera* phenomena are interpreted by the complicated methods of Morgan. *Oenothera* facts are considered by the author to fall under all the modes of heredity recognized in his previous publication (1919) [see Bot. Absts. 4, Entry 523].—J. P. Kelly.

3813. BREEDER, C. M. Hermaphroditism of a croaker, *Micropogon undulatus* (Linnaeus). *Zoologica* 2: 281-284. 1 fig. 1922.—Among a "large number" of *M. undulatus* taken at Atlantic City, New Jersey, a specimen was found "normal in all respects" externally that could not be stripped. It appeared to be a female turgid with eggs. On dissection it showed 2 perfect ovaries and 2 perfect testes dorsal to the ovaries. "The junction of the ova, sperm and urinary ducts appeared to be at the genital pore." "Both sets of gonads seemed well developed and in the state most frequently found in normal individuals of this species taken about the same time. . . . The testes were soft and flocculent, and easily ruptured, the milt streaming out from such injuries, but they were not quite ripe enough to strip, and the ovaries were also a little too green for that operation." The specimen appeared to be about 5 years old and therefore had passed through at least 1 spawning season. The author suggests that it may be a case of functional hermaphroditism in which the specimen might be self-fertilized or act, in cross fertilization, as either male or female. The author notes that bi-sexuality has been recorded for the following families and orders of teleosts: Cyprinidae, Clupeidae, Salmonidae, Esocidae, Poeciliidae, Gasterosteidae, Mugilidae, Percidae, Serranidae, Sparidae, Scombridae, Labridae, Squamipinnes, Gadidae, and Pleuronectidae. This case appears to be the 1st record of a case in the Sciaenidae. The specimen is deposited in the U. S. National Museum as No. 66,140.—A. W. Bellamy.

3814. BRESLAU, MOLLISON. [German rev. of: (I) BAUR, ERWIN, EUGEN FISCHER, und FRITZ LENZ. Grundriss der menschlichen Erblichkeitslehre und Rassenhygiene. I. Menschliche Erblichkeitslehre. (Fundamentals of human genetics and race hygiene. I. Human genetics.) 16 X 22 cm., 305 p., 66 fig. J. F. Lehmann: Munich, 1921. II. LENZ, FRITZ. Menschliche Auslese und Rassenhygiene. (II. Human selection and eugenics.) 16 X 22 cm. vi + 251 p. J. F. Lehmann: Munich, 1921.] *Zeitschr. Morphol. u. Anthropol.* 22: 332-336. 1922.

3815. BUSHNELL, JOHN W. Results of selection in the Alaska pea. *Proc. Amer. Soc. Hort. Sci.* 18: 41-47. 1921 [1922].—Single-plant selections of Alaska peas have isolated strains giving higher yields under experimental conditions than seed of the same variety obtained from a number of seed firms. Data presented show "that strains derived from single-plant selections in the Alaska pea possess measurable differences, differences of a genetic nature; and it is reasonable to expect that this genetic difference will result in measurable differences in yield when the strains are tested under field conditions."—H. A. Jones.

3816. CHRISTIE, W. Die Vererbung gelbgestreifter Blattfarbe bei Hafer. [Inheritance of yellow-striped leaf-color in oats.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 27: 134-141. 1 fig. 1921.—From a single oat plant having prominent stripes of yellow in the leaves and sheaths, a series of naturally self-pollinated progenies were grown during several years. Both normal and striped plants appeared in the progenies, whether the mother plant was green or striped. No system of inheritance of the striping was reported.—E. W. Lindstrom.

3817. COLLINS, E. J. Variegation and its inheritance in *Chlorophytum elatum* and *Chlorophytum comosum*. Jour. Genetics 12: 1-17. 8 pl., 3 fig. 1922.—Variegated (green and white) forms of *Chlorophytum elatum* and *C. comosum* are described. The nature of the growth of the green and white areas from the meristematic tissue is discussed. Green, white, and variegated seedlings arise from self-pollination, from varietal crosses, and from crosses of the species. A Mendelian analysis of the results could not be evolved. The author considers the green-white (or green and colorless plastids) pair of characters as allelomorphs but is inclined to believe that somatic segregation of these allelomorphs is a very plausible explanation for the irregular genetic results.—E. W. Lindstrom.

3818. CONKLIN, EDWIN GRANT. The proposed suppression of the teaching of evolution. Science 55: 265-266. 1922.—The origin of man from other animals is not more degrading than origin from dust. "It is mud or monkey." Other doctrines once opposed by theologists have been generally accepted. The doctrine of evolution has been generally adopted in other fields of learning, even by progressive theologists. Those who wish to change educational institutions should do so by establishing new schools to teach specified doctrines instead of limiting those now in existence.—A. Franklin Shull.

3819. CUNNINGHAM, J. T. Biological terminology. Nature 108: 368-369. 1921.—It is held that Goodrich [see Bot. Absts. 11, Entry 3843] ignores many new conceptions and results secured by new studies in heredity. Results from Mendelism show that a character may be inherited even if not possessed by either parent. It is a misuse of terms to state that all characters are acquired during the lifetime of the individual. Characters due to genetical factors are developed rather than acquired; those brought about by changed environment are acquired. Mutative evolution has but little relation to adaptation.—L. R. Waldron.

3820. CUNNINGHAM, J. T. Heredity and biological terms. Nature 106: 823-829. 1921.—The definitions held to by Sir Bryan Donkin [see Bot. Absts. 11, Entry 3828] are those generally accepted by biologists. It is not believed that the division of human characters into "innate" and "acquired" leads to confusion. It is argued that the use of the term "acquired character" has no proper biological objection. Arguments up to the present have failed to show that all characters are innate and acquired, exactly in the same sense and degree.—L. R. Waldron.

3821. CUNNINGHAM, J. T. Some problems in evolution. Nature 109: 41-42. 1922.—It is held that the term "variation" should mean the extent or degree of difference between individuals,—not a new character or assemblage of characters. Further, such variation is due to some change in the germ plasma or in the environment. It is also believed that there is no real difference between the terms "variation" and "character;" the latter is perhaps the less ambiguous of the two. Three kinds of "characters" should be distinguished. One, resulting from environment, is non-inherited. Of the 2 inherited kinds, one is adaptive and generally recapitulatory; the other shows no relation to differences of habit or environment and does not recapitulate the ancestry.—L. R. Waldron.

3822. CUTHBERTSON, W. The problem of immunity to wart disease in potatoes. Gard. Chron. 71: 104. 1922.—The author reports on the wart reaction of 246 seedlings resulting from open-pollinated seed of seven varieties of potatoes. The numbers of non-warted and warted, respectively, were as follows: in variety President, 14:15; Priory Queen, 8:0; Favorite, 14:2; Climax, 26:2; Templar, 28:5; Admiral, 48:5; and Majestic, 38:22. There were 19 seedlings doubtful.—J. P. Kelly.

3823. DALCQ, ALBERT. Etude de la spermatogénèse chez l'Orvet (*Anguis fragilis* Linn.). [Spermatogenesis of the Orvet (*Anguis fragilis* Linn.).] Arch. Biol. 31: 347-452. 1921.—This study deals with 3 phases of the spermatogenesis of the Orvet (a lizard). 1. Seasonal cycle. In March the testes are filled with primary spermatocytes usually in the pachytene stage.